

PLAN FOR AN AREA AFFECTED BY  
THE VALLEY FORGE EXPRESSWAY

By

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B. Arch., Yale School of Architecture, 1942

Submitted in partial  
fulfillment of the  
requirements for the  
degree of Master in  
City Planning.

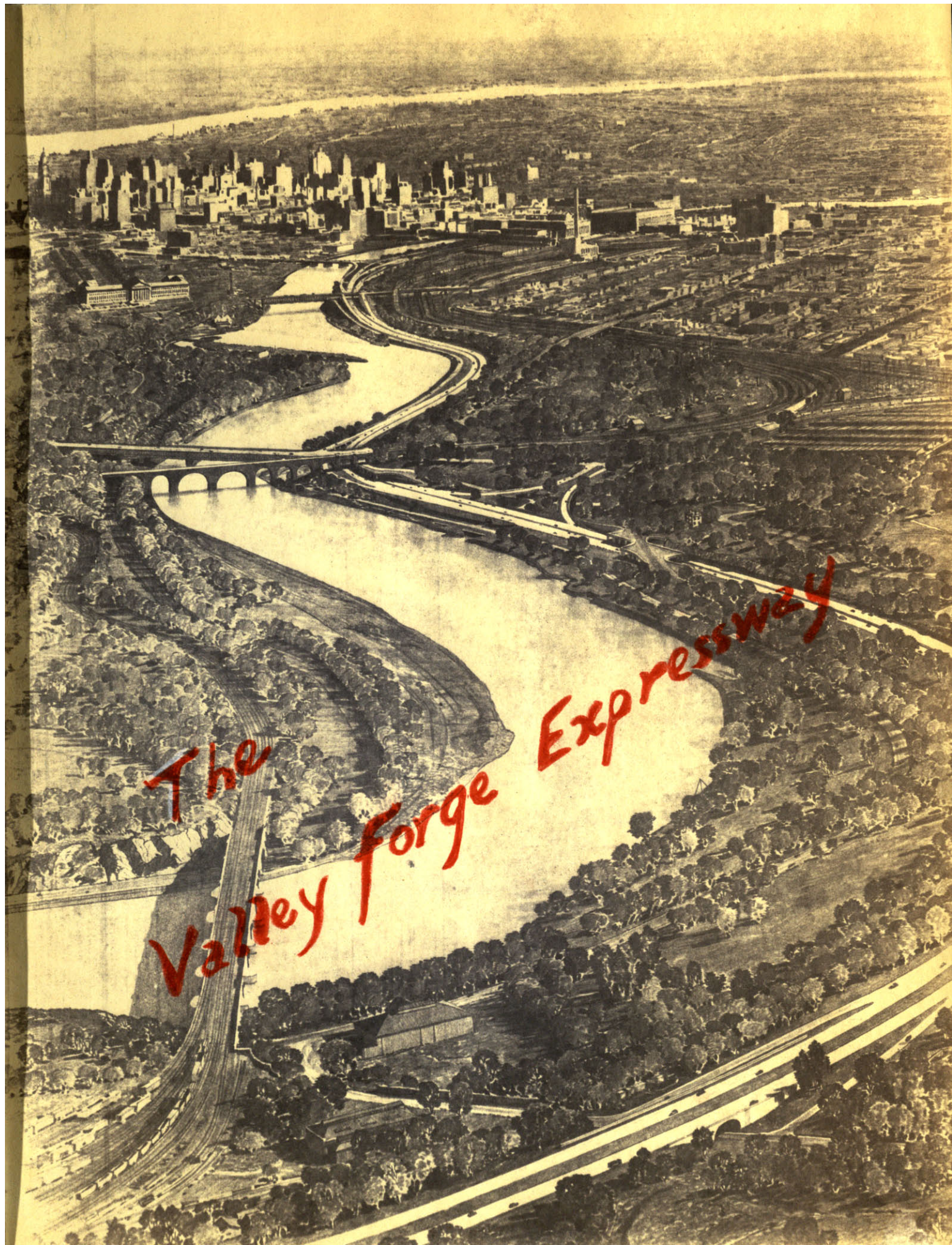
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May 1950





The Valley Forge Expressway



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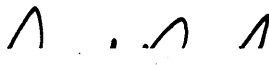
May 19, 1950

Professor Frederick J. Adams, Dean  
School of Architecture and Planning  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

Dear Professor Adams:

I herewith respectfully submit this thesis entitled "Plan for  
an Area Affected by the Valley Forge Expressway," in partial ful-  
fillment of the requirements for the degree of Master in City  
Planning.

Respectfully,

  
David D. Longmaid

DDL:IMH

### ACKNOWLEDGMENT

The author wishes to acknowledge the inspiration of Oscar Stonorov, and generous provision of office space by him for the work done in Philadelphia.

This thesis could not have been written without the complete and wholehearted assistance of the Philadelphia City Planning Commission. I am indebted to Mr. Edmund Bacon, Executive Director, and Mr. Hans Blumenfeld, Chief, Division of Planning Analysis, for their generous cooperation in furnishing data from published and unpublished studies.

May, 1950

David D. Longmaid



## PREFACE

In laying out the Valley Forge Expressway, it was the practice of the State Highway Commission to run 4 survey lines to determine the route. This was done for two reasons: one, the best possible route to follow; secondly, to prevent any land speculation in the path of the final construction. The result was that almost every house or neighbor's house had a stake planted in their tulip bed, and the visions of levelled homes and dislocation or loss of value in their house was faced by all the suburbanites in the area south of the Schuylkill River.

This danger is real, but the ungoverned development of hot dog stands and subdivisions is the greatest threat, and improperly controlled--the more insidious.

This study is directed at first measuring these real dangers, and secondly developing a plan that eventually will guide and channel this future development into ordered work and living areas.

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\* P.M.D. - Philadelphia Metropolitan District

\*\* P.M.A. - Philadelphia Metropolitan Area

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## INTRODUCTION

Today cities are passing from the plan and blueprint to the building stage of expressway networks. The first radiating arm of Philadelphia's network, the Valley Forge Expressway, is now half in the engineering drawings and half under construction. Upon its completion the unbuilt peripheral area will be opened up for residential and industrial development. The urban sprawl will engulf more open land.

An area has been selected in which the full impact of the Valley Forge Expressway will be realized. The 17.46 square mile tract of land, referred to as the Study Area in this report, is composed of Upper Merion Township (16.8 square miles) and the Borough of Bridgeport (.66 square miles). The natural boundaries are the Schuylkill River to the north, the steep slopes of West Conshohocken to the east, and the hills of Valley Forge Park to the west. The open farm land of Chester Valley extends to the southwest.

This area has been afflicted with many, if not all, of the malpractices in land that cause blight and arrested development on the urban fringe. Abandoned quarries, disfiguring tailing dumps, scattered industry, spotty residential growth, premature subdivisions, coupled with traffic congestion and heavy trucking have left their mark. These misuses of the land stand as impediments to proper development.

In addition, the area is threatened with unplanned speculative development in the future. The result will be inefficient and costly




















street and utility patterns, inadequate parks and playgrounds, and ribbon shopping and service stations.

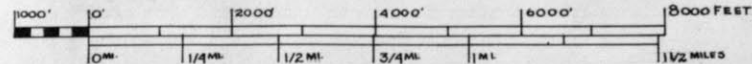
A realistic solution must determine the quantitative and qualitative pressures exerted by the future metropolitan growth on the Study Area for industrial, residential, recreational and commercial use. These forces must be brought into proper balance between the various elements of the plan, such as places of work, places of residence, and the numerous services required by both, such as transportation, recreation and shopping.



LEGEND

-  RESIDENTIAL LAND
-  ELEMENTARY SCHOOL
-  HIGH SCHOOL
-  CEMETARY
-  COMMERCIAL CENTER
-  HEAVY INDUSTRY
-  LIGHT INDUSTRY
-  FUTURE INDUSTRIAL EXPANSION
-  EXISTING DENSELY WOODED
-  PROPOSED DENSELY WOODED
-  PLAYGROUND
-  EXISTING VALLEY FORGE PARK
-  PROPOSED VALLEY FORGE PARK
-  PICNICKING
-  EXPRESSWAY
-  MAJOR ARTERY
-  NEIGHBORHOOD FEEDER ROAD

SCALE

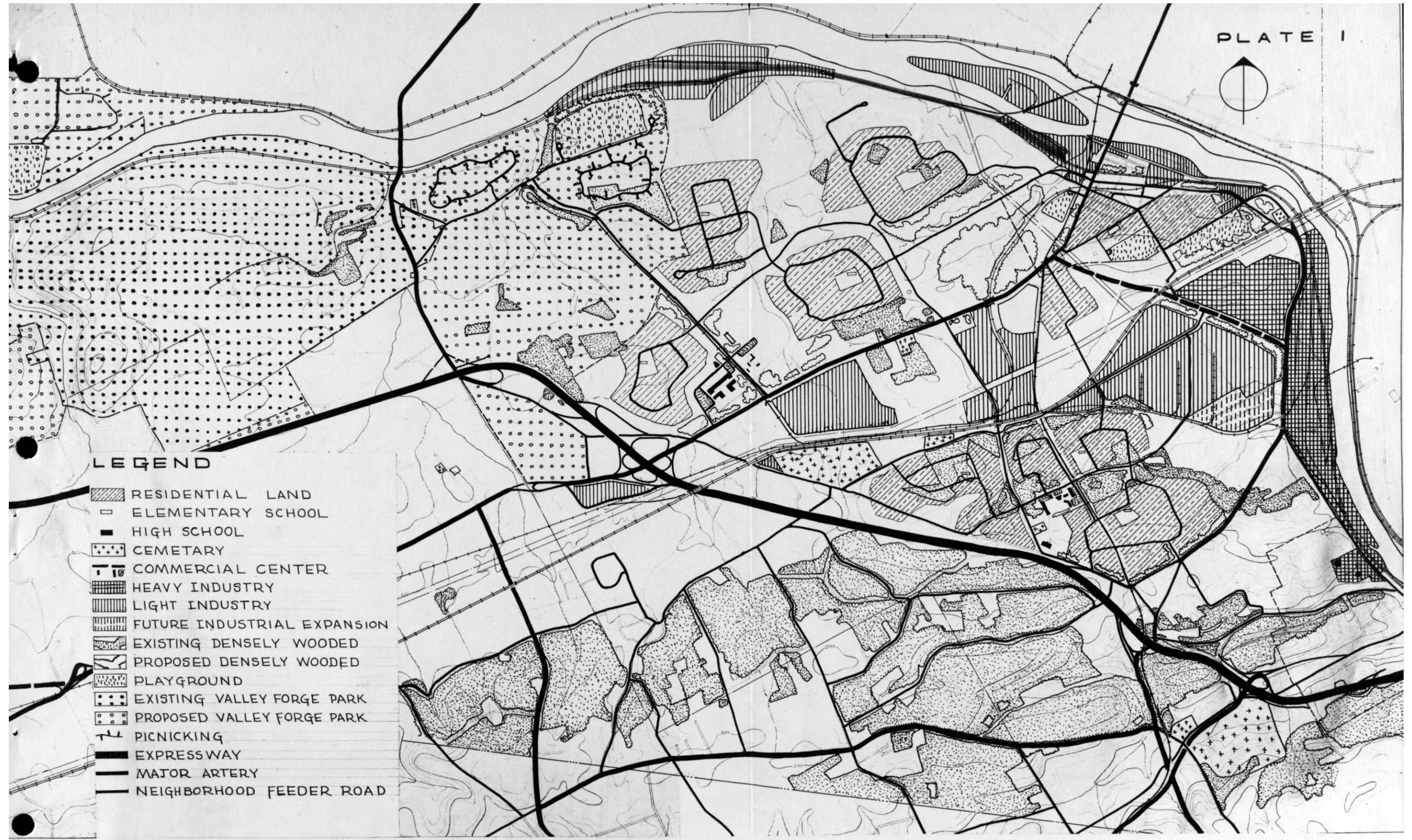


DAVID D. LONGMAID

M.C.P. THESIS, SPRING 1950

MASS. INSTITUTE TECHNOLOGY

PROPOSED LAND USE



SUMMARY OF MAJOR RECOMMENDATIONSBased on Target Date - 1980

## General

- Establishment of industrial districts, properly served by road, rail and other services, with a variety of sites and services.
- Creation of two new communities--one of 20,400 persons north of King of Prussia, the other of 17,500 between the Pennsylvania Railroad's "Trenton cutoff" and the Valley Forge Expressway.
- Redevelopment of Bridgeport as a neighborhood of the Norristown Community.

## Industry

- Extension and concentration of industrial development in wedge-shaped industrial district based on a total of 17,100 jobs in manufacturing by 1980 in the Study Area.
- Creation of 325 acre light industrial estate southeast of Bridgeport in Swedeland.
- Creation of 130 acre site for landscaped campus type light industry at apex of wedge.
- Creation of 25 acre truck terminal site southwest of King of Prussia to control local rash of trucking services and act as distribution point for through trucking.



- Residential
- Development of two communities, based on an increase of population of 34,900, composed of neighborhoods with population range of 4,500 to 6,500 persons in each neighborhood with own elementary school, neighborhood shopping center, parks and playgrounds.
  - Eventual construction of new high school in largest community.
  - Development of mixed dwelling units to gain cross section of families and maintain a balanced social community.
  - Reduction of Bridgeport population through redevelopment of Swedesburg and eventual elimination of blighted area of Swedeland.

- Parks  
-  
Valley Forge
- Maintain Valley Forge as national shrine, but create three new satellite parks for active recreation, almost doubling the existing 2,300 acres.
  - Eliminate two objectionable industries.
  - Request state to deed North Abrams Impounding Basin to park, in addition to the Valley Forge Impounding Basin, to be the nuclei of active recreation and picnic areas.
  - Purchase Valley Forge Golf Course by park as regional recreational facility.
  - Acquisition of hilly area southwest of park for hikers and picnickers.

- Local Parks
- Creation of a densely wooded natural area west of Bridgeport, over Bethlehem Mine tailing dump.
  - Redevelopment of Swedesburg area between Pennsylvania Railroad "Trenton cutoff" and Bridgeport Borough line that is now blighted and unsewered, into a park and playground buffer strip.
  - Creation of a new park area as a buffer strip between new industrial district and proposed 15,000 community.
  - Development of buffer strip along Route 202 between future community of 20,700 population and heavy traffic artery.
- Expressways
- Relocate Route 202 to conform with proposed Outer Belt Expressway proposed by Philadelphia City Planning Commission with addition of connection from Willow Grove to Doylestown. The urgency of this by-pass to ease traffic through Bridgeport and Norristown is unquestioned.
  - Develop existing Route 202 southwest of King of Prussia as limited access way with zoned right of way.
  - Acceptance of proposed expressway connection of Route 202 to Route 30 at Glenlock.
  - Development of expressway link connecting Lancaster Pike to Expressway at West Conshohocken.

- Major Roads
- Stimulate industrial development in district and eliminate heavy traffic through Bridgeport by creation of new road serving industrial district direct with new railroad underpass.
  - Improvement of Gulf Mills to Bridgeport road.
  - Construction of new turnoff from turnpike direct to Route 23 for Valley Forge Park.
- Minor Roads
- Minimum relocation of existing road pattern to permit proper neighborhood development.
- Transit
- Extension of Philadelphia Western Trolley Line to serve future industrial and residential areas and proposed Valley Forge recreational area.
- Utilities
- Creation of a sewer district to serve Bridgeport and Upper Merion with one major sewer interceptor along Schuylkill River.
  - Development of Sewage Disposal Plant in industrial district east of Bridgeport.





PHILADELPHIA METROPOLITAN DISTRICT  
PHILADELPHIA CITY PLANNING COMMISSION

0 1 2 4 6 8 10  
SCALE IN MILES.

## PART I - TRANSPORTATION

The Study Area composed of Bridgeport and Upper Merion is subject in the future to two main development thrusts: one originating from the stirring and shifting and demands for greater space by the Philadelphia Metropolitan Center; the other from the forces originating from the west in the form of traffic via the Pennsylvania Turnpike. Both thrusts are transmitted through existing and proposed transportation routes.

### TOPOGRAPHY AND EXISTING TRANSPORT

The Study Area is located at the strategic intersection of the Chester Whitemarsh Valley with the Schuylkill River Valley. (See Plate 2.)

The Chester Whitemarsh Valley is the principal level area west of Philadelphia. This topographic formation is based on a low-lying belt of limestone, varying in width from 0 at its western end at Coatesville, outside the Philadelphia Metropolitan District, to about three miles at a point slightly east of Conshohocken. The limestone deposits have been developed by a number of quarries, and there are several stone-crushing, cement and magnesia plants, plus the blast furnace at Swedeland in the Study Area. The Valley is also noted for some of the richest farm land in the country.

The floor of the Chester Whitemarsh Valley offers a low-grade, low-level route from west to northeast Philadelphia for the heavy tonnage freight trains of the Pennsylvania Railroad. This line is called the "Trenton cutoff," and permits the operation of through

freight trains from the Enola Yards at Harrisburg to the New York Metropolitan area, by-passing the delays of the older route through Philadelphia. (See Plate 2.) The Pennsylvania Turnpike also follows the Chester Whitemarsh Valley and turns into the Schuylkill Valley at West Conshohocken, the eastern limit of the Study Area.

The Schuylkill River Valley, cutting through the Piedmont Plateau, is Philadelphia's level route to the west. In 1823 the Schuylkill Canal was completed, extending 106 miles west to tap the anthracite coal region for Philadelphia's growing industry. This was a principal reason for the original growth of Norristown and Bridgeport as industrial areas. Today the Pennsylvania and Reading Railroads follow the Schuylkill River with their Valley Lines.

The development of the Valley Forge Expressway through this same valley will reenforce the present east-west transportation axis and emphasize the locational advantages of the Norristown-Bridgeport area. Plate 2 also shows the tie-in of the principal east-west rail lines with the New York Division of the Pennsylvania Railroad that follows the Fall Line, a more or less abrupt change in the slope of the land, between the Piedmont and the Coastal Plain.

#### EXPRESSWAY NET

##### Pennsylvania Turnpike

The principal highway between Philadelphia and the west, and planned to terminate in the Study Area, is the Pennsylvania Turnpike, a toll road, under a turnpike commission. At present, it extends between the western outskirts of Harrisburg (Carlyle) and the eastern



outskirts of Pittsburgh (Irwin), crossing the folded mountains on a grade originally prepared for, but never used by, a railroad. It tunnels through the major ridges.

Plans are now being made to extend the expressway west to the Ohio State line by 1953. By 1955 the Ohio Expressway, passing near Cleveland, is expected to be completed, finally connecting the intensely developed industrial area of the central states to the port of Philadelphia. The eastern extension from Harrisburg to Philadelphia will be completed as far as King of Prussia, the terminus, by Labor Day 1950.

#### Valley Forge Expressway

The toll-free expressway extending the Turnpike into Philadelphia is under the Pennsylvania Department of Highways. (See Plate 3.) It consists of two parts: the Valley Forge Expressway, from King of Prussia to City Line Avenue (12.13 miles), to be completed by 1953, and the Schuylkill Expressway (10.25 miles) from City Line Avenue into North Broad Street, Philadelphia, scheduled for completion some time between 1953 and 1956. The section of the Valley Forge Expressway from King of Prussia to West Conshohocken, and included in the Study Area, is now under construction, and work should be finished on this part late in 1950.

#### Competitive and By-Pass Routes\*

The principal competitive route for truck and passenger traffic generated from the mid-west is the proposed New York Thruway. This

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\* H. G. VanRiper, Department Head of the Division of Highway Planning, Pennsylvania Department of Highways.

route will run from Cleveland via Buffalo, Syracuse and Albany to New York City, approximately 695 miles. The use of the Pennsylvania Turnpike will cut this mileage to 512 miles for the trip from Cleveland to New York, a saving of 183 miles. This simple fact places the Turnpike as first choice for through traffic to New York.

Fortunately or unfortunately all this traffic will not descend on King of Prussia and Philadelphia. A southern cut-off is proposed running from Breezewood (west of Harrisburg) via Hagerstown to join with the proposed Maryland Expressway, serving Baltimore and points south. Another interceptor is planned from Harrisburg to George Washington Bridge. This will be a more direct route for New York destined traffic, going via Route 22, then a future expressway by-pass of the congested cities of Allentown, Bethlehem and Easton, and finally Route 6, an existing New Jersey expressway, to George Washington Bridge.

#### Relocation of Route 202

Of immediate concern to the Study Area is the relocation of Route 202, running north from the Turnpike cloverleaf at King of Prussia. The existing route through Bridgeport and Norristown has reached a point of saturation due to heavy trucking and local traffic. The State Highway Planning Division has let engineering contracts for the determination of a new location for Route 202 west or east of Norristown, starting from King of Prussia.

Plate 3 shows the proposed west route across the Abrams Reading Railroad classification yard and through Jeffersonville, the high-grade residential area west of Norristown. Future industrial development is expected to occur on the Philadelphia side of Norristown. If the route

is located to the west of Norristown, it will force heavy trucking to move through Norristown's already congested and inadequate streets, or via a costly by-pass to serve the industrial districts.

If the new Route 202 goes east, it will literally parallel the new Valley Forge Expressway into Conshohocken. It will then conflict or duplicate the "Outer Belt Expressway" proposed by the Philadelphia City Planning Commission.

It is strongly recommended that the location of this route be reconsidered. Plate 3 shows the alternate proposal in red, based on the following factors:

(1) The cost of 13 miles of expressway would be saved by eliminating 24 miles and adding 11 miles in addition to the "Outer Belt Expressway."

(2) Driving distance from King of Prussia to Doylestown would be increased only four miles or a matter of five minutes' driving time.

(3) The future industrial growth areas east of Norristown would be served more economically and efficiently by shorter and more convenient access roads.

(4) The proposed Doylestown Willow Grove Expressway forms a natural radial expressway serving and developing the northern areas.

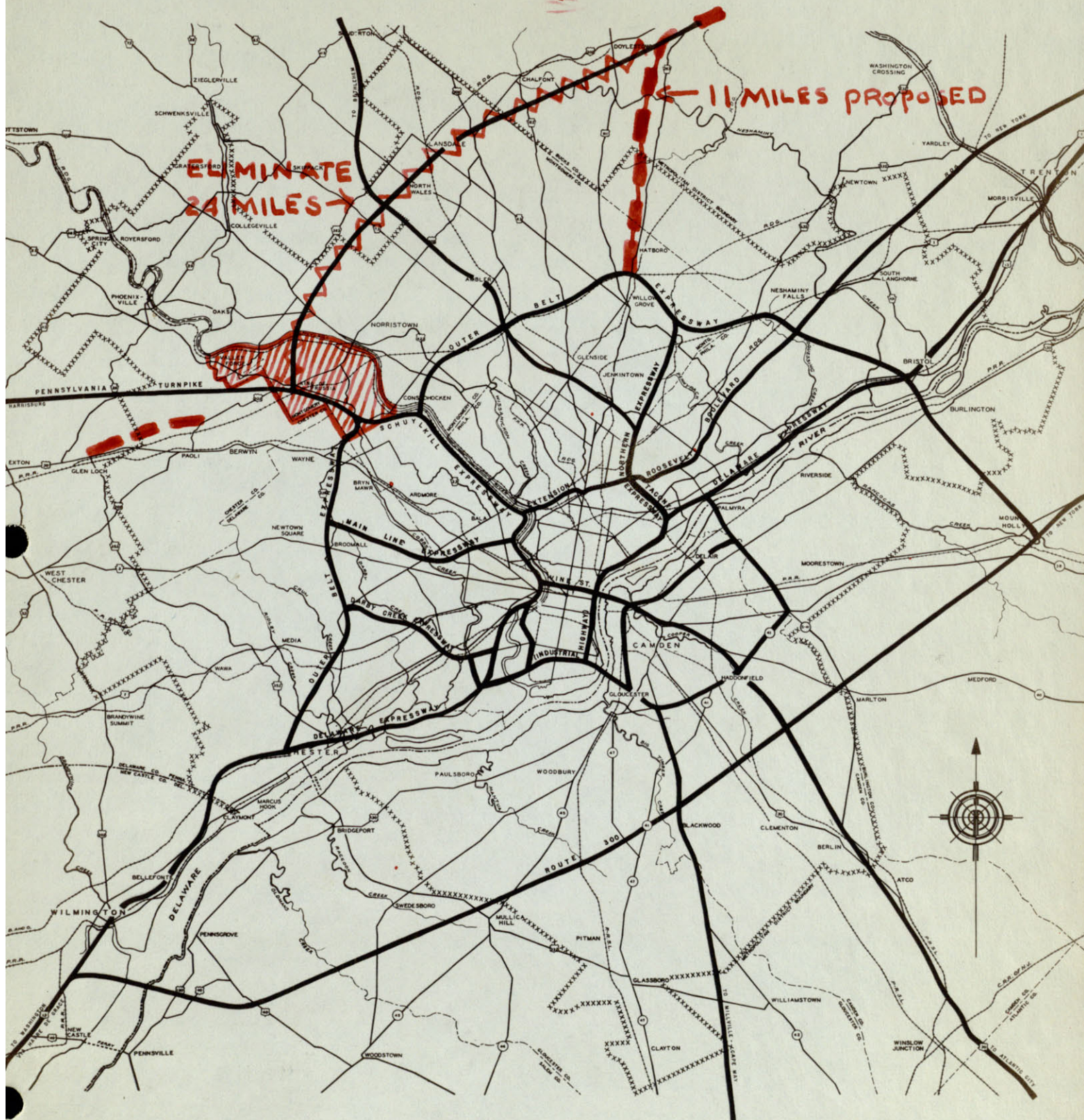
(5) The "eliminated" Route 202 in Plate 3 serves very little population as seen in Plates 10 and 11 of existing and proposed population distribution.

For the purposes of this study, the northern leg of Route 202 will follow the "Outer Belt Expressway."

The southwest leg of Route 202 will be extended along the Chester Valley, by-passing Paoli, and connecting to Route 30, the Lincoln



PLATE 3  
**PRELIMINARY EXPRESSWAY PLAN**  
PHILADELPHIA METROPOLITAN DISTRICT



PHILADELPHIA METROPOLITAN DISTRICT  
PHILADELPHIA CITY PLANNING COMMISSION

PRELIMINARY PLAN - NOT ADOPTED BY THE  
PHILADELPHIA CITY PLANNING COMMISSION -  
APPROVED FOR RELEASE FOR REVIEW AND  
REFERENCE ONLY MARCH 1949

0 1 2 4 6 8 10  
SCALE IN MILES



Highway, at Glenlock. The heavy traffic that now goes from the Lincoln Highway through the shopping centers of the Main Line on Lancaster Pike\* will be diverted at this point and channeled into the Valley Forge Expressway at King of Prussia. In the distant future this route would be extended to tie into the Maryland Expressway System.

Route 202 in the Study Area at present is comparatively free of billboards, diners and filling stations. The expected increased traffic load will create the pressure for these facilities. Police power in the form of zoning or the acquisition of a 120' right of way will be required to prevent this unsightly rash. The former is recommended. Provision, however, must be made to provide for adequate passenger car and truck services. These will be discussed in the Truck Terminal section.

#### Estimated Future Traffic

The Planning Division of the State Department of Highways has estimated the 1970 future traffic at the various intersections of the Valley Forge Expressway. (See Plate 4.)

The prediction for the total traffic for the Turnpike at King of Prussia is believed to be an underestimation. The 11,472 vehicles (5,736 each way) is admittedly based on a report\*\* for future toll collections on the Turnpike Extension to King of Prussia.

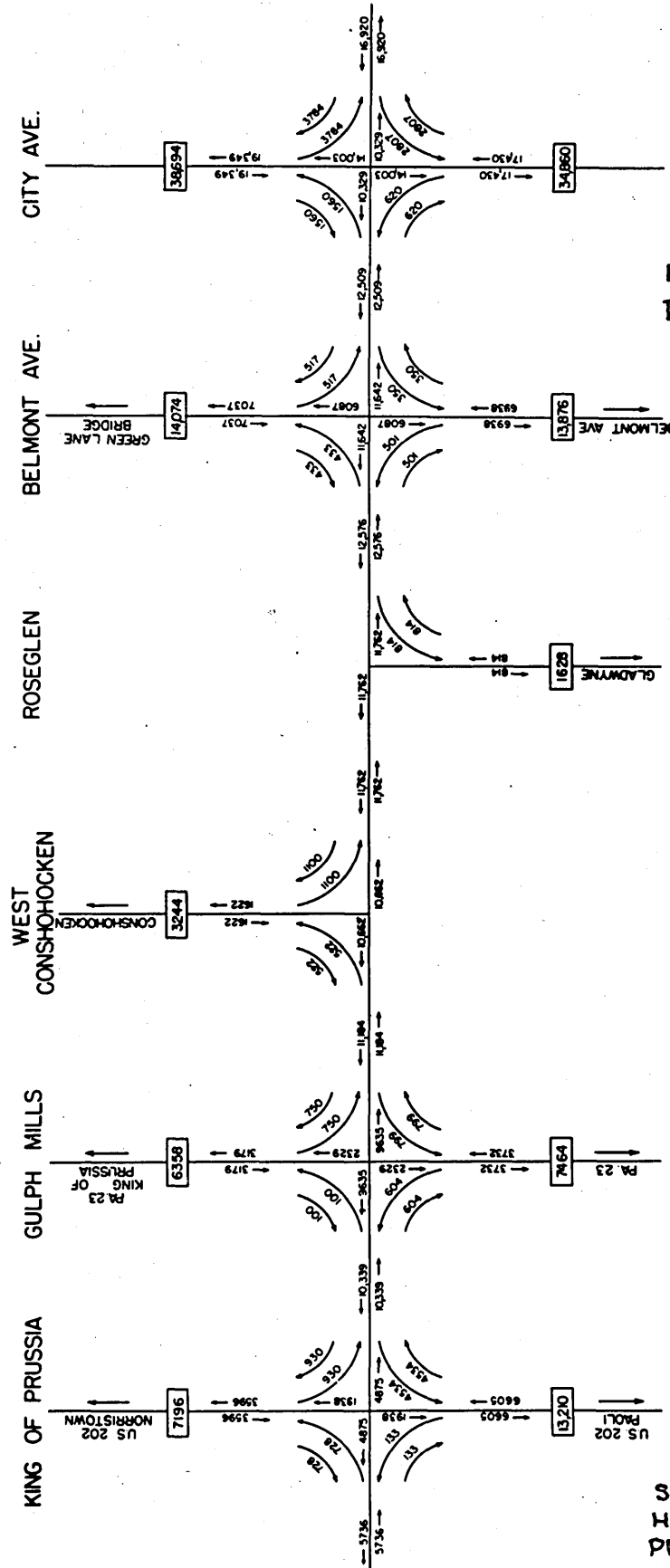
The following factors were applied to make the estimate in this report:

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\* A traffic count on U.S. 30, Lancaster Pike and Ithan Avenue (Station 26) showed total vehicle trips of 14,620 (3,299 trucks and 11,321 passenger cars). "Philadelphia Camden Area Traffic Survey," Pennsylvania Department of Highways and New Jersey State Highway Department in cooperation with the Public Roads Administration, Federal Works Agency and the Philadelphia City Planning Commission, 1949.

\*\* Parsons, Brinckerhoff, Hogan and Macdonald, Engineers, "Report on Estimated Revenues from Tolls on the Pennsylvania Turnpike and the Proposed Philadelphia Extension," June, 1948.

# ESTIMATED FUTURE TRAFFIC PLATE VALLEY FORGE EXPRESSWAY



ESTIMATED AVERAGE  
DAILY TRAFFIC, 19

SOURCE OF DATA:  
HIGHWAY PLANNING DIV  
PENNSYLVANIA DEPARTMENT  
OF HIGHWAYS

RECOMPUTED AT: **26,400**

(1) From a survey conducted from June to October 1947, 10,756 average daily thru trip prospects were estimated.

(2) The yearly increase in 1947 was at the rate of 10% per year. The report estimated a more conservative figure of 5% a year.

(3) "Facility increase" or induced traffic was estimated at between 40% to 100%.

(4) "Sales resistance" due to tolls was estimated as reducing prospective users by 60%.

The final estimate for traffic using the Philadelphia Extension in 1951 was 2,250,955\* or an average daily traffic of 6,167. In recomputing this total, factor 3 above was established at approximately 25% in their calculations.

These estimates were made to determine the future toll receipts and, therefore, are extremely conservative--a defensible minimum to base financial estimates for total construction costs.

A more realistic estimate can be developed from examining existing and future trends.

The past toll receipts from the Pennsylvania Turnpike\*\* show that between 1946 and 1948 the total receipts were doubled, an increase of 50% per year. The total receipts in 1948 were 59% above their pre-war peak of \$3,300,000 for 1942. The rapid increase after the war should taper off somewhat, but the growth in expressway use should be the annual increase of 10%.

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\* Parsons, Brinckerhoff, Hogan and Macdonald, Engineers, op. cit.

\*\* Highway Planning Division, State Department of Highways, "Graph of Pennsylvania Turnpike Toll Receipts 1941 to 1948 for Truck, Passenger and Buses," June, 1948.

The continued expansion of expressway facilities (i.e., the extension of the expressway to the middlewest) will develop an increasing induced traffic load.

If the "sales resistance" to tolls is as high as 60%, it appears that if the toll were lowered the increased use of the expressway would increase the total revenue. If this did occur, the future traffic estimates as shown above would be far under the future actuality. The possibility of complete elimination of the toll in the future should also be considered for long-range planning.

A recapitulation of the preceding 1951 estimate follows:

(1) Estimated average daily thru trip prospects in 1947	-	10,756
(2) Average yearly increase, 10%: 4 years X 1,075	-	4,300
(3) Facility increase, 60% of items (1) and (2)	-	<u>8,853</u>
		23,900
(4) "Sales resistance" reduced to 40% due to anticipated toll reduction	-	<u>-9,560</u>

Estimated average daily traffic using the Philadelphia Extension in 1951	-	14,340
--	---	--------

The same toll receipt study\* estimated an increase from 1951 to 1960 of 184% in total toll receipts. The increase after that date is expected to be negligible. Since toll receipts are in direct proportion to traffic volume, it is assumed that the traffic will also increase proportionately. Therefore:

$$\begin{array}{rcl} 184\% & \times & 14,340 \\ (\% \text{ increase}) \times (1951 \text{ estimated thru traffic}) & = & 26,400 \\ & & \text{1960 estimated thru traffic.} \end{array}$$

---

\* Highway Planning Division, State Department of Highways, op. cit.

26,400 represents 130% increase over 11,472, the estimate of the Highway Planning Division. (See Plate 4.) The other traffic estimates seem more dependable.

### Truck Traffic

Trucks will form a goodly proportion of the future estimated traffic for the Pennsylvania Turnpike. The following table shows this:

Table 1

Classification of Average Daily Prospects for Thru Trips on  
Philadelphia Extension  
1947 and 1960

Classification	1947* Number	% of Total	1960 Number
Buses	50	.5%	130
Passenger	7,807	72.6%	19,100
Trucks	2,899**	26.9%	7,170
Total	10,756***	100.0%	26,400***

\* Parsons, Brinckerhoff, Hogan and Macdonald, Engineers, op. cit.

\*\* Composed of 2,534 heavy, 232 medium, 133 light.

\*\*\* Included: only traffic estimated for Turnpike.

The trend of trucking is still strongly upwards. In 1941, prior to the war and gas rationing, trucks contributed 35% of the total toll receipts for the Turnpike. In 1947 trucks jumped to 53% of total toll receipts, a relative gain of 20%.\*\*\*\* Several basic factors indicate the continued growth of trucking.

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\*\*\*\* Highway Planning Division, State Department of Highways, op. cit.



(1) Technological improvements have been advanced by developments in World War II. Developments of more efficient diesel and gas turbine engines are expected.

(2) Increased development of suitable roads (i.e., expressways) will reduce fuel, tire and maintenance costs and increase speed of service of over-the-road trucking.

(3) Growing demand for trucking by industry due to flexibility of service--door-to-door deliveries and ability to handle special types of freight which would otherwise require special handling and packing to reduce breakage.

(4) Truckers organizing into a strong political group.

#### Truck Terminal

A problem of immediate and long-range concern is the development of adequate truck facilities at King of Prussia. A 25-acre truck terminal site is recommended in the southeast corner of the cloverleaf at King of Prussia to meet these needs. (See Plate 1.)

This proposal is based on the following factors:

(1) The new expressway net will place King of Prussia 25 to 35 minutes from most of the industrial and commercial areas in Philadelphia.

(2) No other site exists or can be developed. Gulf Mills, the next interchange toward Philadelphia, is complicated by the Philadelphia and Western Trolley Line, the expected heavy movement of passenger traffic, and the high residential development that occupies level land immediately adjacent to the expressway. The remaining route of the Valley Forge and Schuylkill River Expressways is located either in the hilly, residential bluff of the Schuylkill River Valley or in Fairmont Park.

(3) King of Prussia is the junction of Route 202 which will become increasingly important. In addition, the proposed industrial growth will be a truck traffic generator.

The proposed truck terminal would serve several varied functions:

(1) Service to truckers and maintenance for trucks.

The immediate problem at King of Prussia is the prevention of the rash of diners, gas stations and large tar areas that will develop ribbon-wise along Route 202. The planned development of these facilities will prevent this.

(2) Terminal for serving adjacent areas.

King of Prussia is strategically located as a collection and distribution point for less than truckload lots (L.T.L.). Routes 23 to Phoenixville, 363 north to Collegeville, 202 north to Norristown, and south to Paoli and West Chester, Downingtown, Coatesville; plus 83 and 652 to Stratford, serving the population concentrations along the Main Line, form a radiating pattern from this central point. Smaller delivery vehicles could be used for this service and reduce the need of heavy trucks from travelling through developed residential areas.

(3) Terminal for Philadelphia.

The development of a full-fledged trucking terminal for Philadelphia might be required at King of Prussia in the future. A recent report\* recommended creation of two large truck terminals to intercept over-the-road trucks from New York and Trenton to the north

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\* Knappen Engineering Company. "Report on Preliminary Survey of the Delaware River Port," made for the Delaware River Joint Commission of Pennsylvania and New Jersey, February, 1948, p. 27.

and Baltimore and Washington to the south. One would be located in Northwest Philadelphia and the other near the Southwest Airport. These terminals would store imports and exports to and from the port, eliminating the movement of partially loaded trucks to piers. The report also states that by adding these facilities it "might be helpful in attracting to the port long distance truck traffic that now by-passes it."

A terminal located at King of Prussia would not only serve this function for the port, but in addition the extension into Philadelphia will function as a trunk feeder line and, conversely, a collection line for goods from Philadelphia Metropolitan Area for shipment west. Plate 3 shows this system: the Outer Belt Line serving the northern and southern areas of Philadelphia. The Roosevelt Boulevard Extension, Vine Street, and the Extension of the Schuylkill Expressway will serve the central city.

The proposed 25-acre site of the trucking terminal is oriented and accessible to the two major traffic arteries that will carry the greatest percentage of trucking--the Turnpike and Route 202 southwest of King of Prussia. The final need in terms of acreage should be based on a detailed analysis that is beyond the scope of this study. The 25 acres, however, used in this report have been determined on a rough approximation of 5% of the estimated 1960 truck traffic using the terminal, plus transit and warehouse sheds equal to the parking area. Allowance has been made for eating and rest areas for drivers plus adequate room for future expansion.

## IMPACT OF EXPRESSWAY

This analysis is directed at the effect of the Valley Forge Expressway in terms of competitive time and distance and the resulting rearrangement of existing traffic movements. In addition, the effects of the increased land supply made available by the expressway is discussed.

### Competitive Time Analysis

The Time Diagram in Plate 5 shows that King of Prussia is 18 minutes from City Hall, Philadelphia. This estimate is based on an average speed of 60 m.p.h. on the expressway. The residential areas of Germantown and North and Northeastern Philadelphia are 40 to 50 minutes by car from the Central City, dependent on traffic conditions. A trip from City Hall to King of Prussia during a Friday rush hour took 50 minutes. In the future this time will be cut to one-third, placing the area in a strong competitive position from the standpoint of travel time into the city.

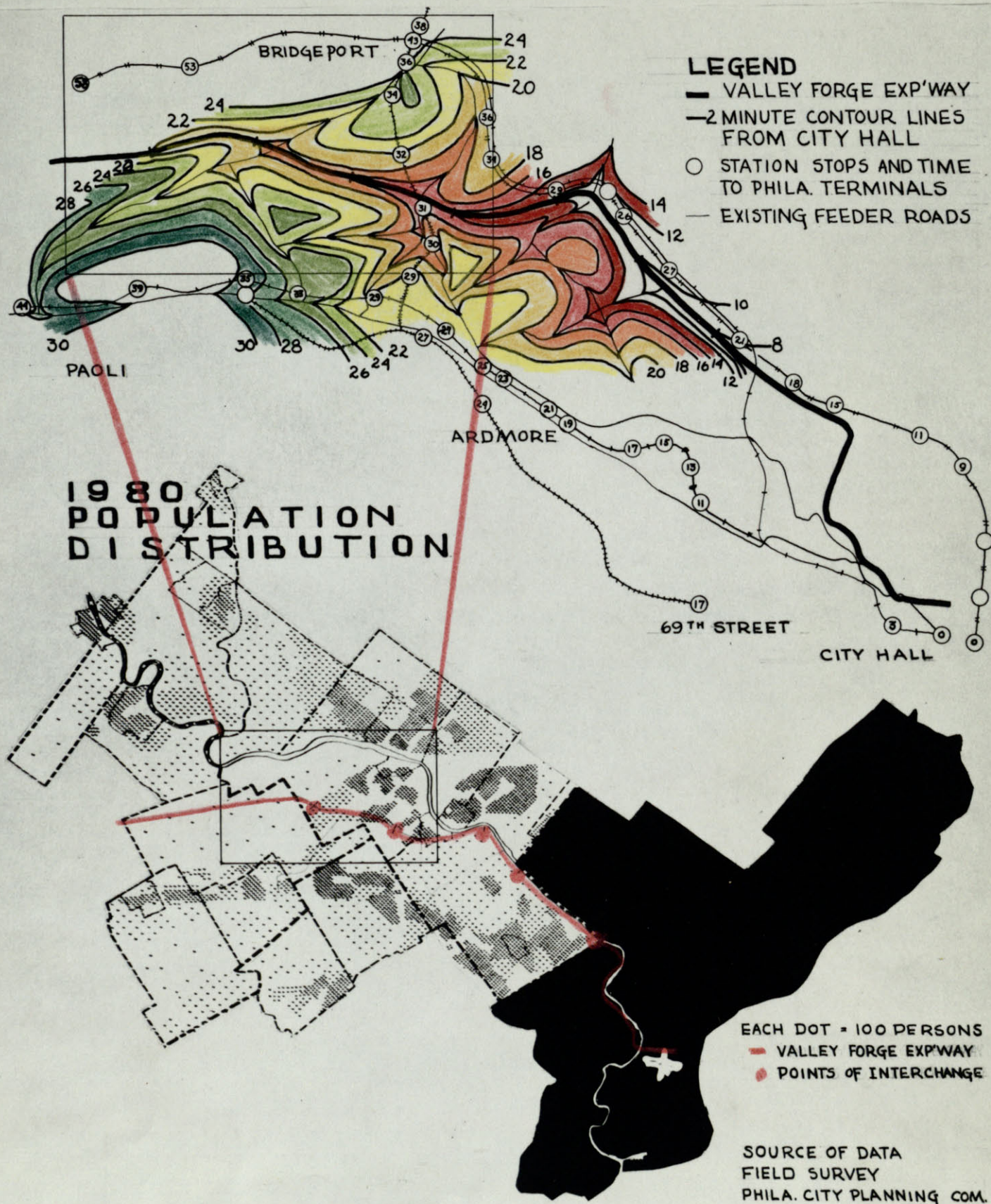
The Time Diagram, Plate 5, also shows how the Study Area will compete with already settled areas along the Main Line. Ardmore, for example, is now 30 minutes from Philadelphia in the rush hour by car, and drivers would probably still follow this same route in the future due to the distance to the expressway and the circuitous route that they would have to follow. The congestion too on the main roads, Lancaster and Montgomery Avenue, would be lessened by traffic further out using the expressway.

Rosemont to Bryn Mawr is considered the critical point. People living west of this area will undoubtedly find it easier to go by



# TIME DIAGRAM VALLEY FORGE EXPRESSWAY

PLATE 3





PLATE

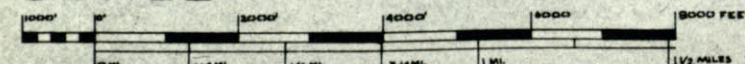


## LEGEND

### BASE MAP LEGEND

- |                      |                            |
|----------------------|----------------------------|
| ■ ESTATE             | ■ PUBLIC, SEMI-PUBLIC LAND |
| ■ 'A' RESIDENCE      | ■ CEMETARY                 |
| ■ 'B' RESIDENCE      | ■ DENSELY WOODED           |
| ■ BLIGHTED RESIDENCE | ■ ORCHARD                  |
| ■ BUSINESS           | ■ NURSERY                  |
| ■ SCHOOLS            | ■ ABANDONED QUARRY         |
| ■ CHURCHES           | ■ PENNSYLVANIA TURNPIKE    |
| ■ INDUSTRY           | ■ VALLEY FORGE EXPRESSWAY  |
| ■ IMPOUNDING BASINS  |                            |

### SCALE



DAVID D. LONGMAID

M.C.P. THESIS, SPRING 1950

MASS. INSTITUTE OF TECHNOLOGY

# LAND USE



the expressway. Note, however, that the 20-minute contour line in the Time Diagram passes through Bryn Mawr and the central part of the Study Area.

The conclusion is that the open land near King of Prussia is in a strong competitive position in regard to time by car with all land outside the 22-minute contour line. The second conclusion is that west of the Rosemont-Bryn Mawr Area the traffic movement along Lancaster Pike will drain north to the Expressway and relieve the heavy traffic movement along Lancaster Pike, Montgomery Avenue and Haverford Road. The Estimated Population Distribution for 1980 shown in Plate 5 in conjunction with the Time Diagram shows that the heaviest commuter traffic movement will occur at Gulf Mills intersection in the southeast section of the Study Area. It is recommended that a section of the proposed Outer Belt (see Plate 3) from Lancaster Pike to the Expressway be earmarked for early construction to avoid the congestion that will occur on the existing inadequate road (Matsonford Road). Plate 1 shows this recommendation.

The trip by car on the Valley Forge Expressway will be at practically constant speeds with negligible grades on a road surface efficiently designed and well maintained. Complete absence of red lights will eliminate stopping, resulting in economies of gas consumption and lower vehicle maintenance costs, partially compensating for the added costs due to greater distance. The greatest boon will result from the freedom from nervous strain caused by irritating traffic noise and congestion.

### Competitive Public Transportation

In competition with the car and expressway are the public transportation facilities, including the Reading and Pennsylvania Railroads, plus the Philadelphia Western Railroad Company, a high speed trolley line from Norristown to 69th Street. Station stops and times to Central Philadelphia terminals have been plotted in the Time Diagram, Plate 5. At Norristown, for example, it takes 43 minutes via the Reading, 38 minutes via the Philadelphia and Western, and only 25 minutes via the feeder road and the expressway into Philadelphia. At Paoli, it takes 44 minutes by the Paoli Local (Pennsylvania Railroad; 37 minutes via the express from Paoli to the Suburban Station; and only 28 minutes via Route 202, King of Prussia, and the Expressway.

Future bus service in conjunction with the expressway system is still in the speculative stage. Two alternatives are offered:

(1) Local buses, transferring passengers to high-speed buses on the expressway and into Philadelphia.

(2) Buses that operate in the local areas and move directly to Philadelphia via the expressway.

### Economics of Increased Land Supply

The preceding analysis points out one major conclusion--that the development of the Valley Forge Expressway will bring a



tremendous increase of total area within the time orbit of Philadelphia. An economist said, "Bettering transportation is more land,"\* and apparently this is happening in Philadelphia. The thrust out toward open land through the expressway network adds to the land in geometric progression--the rule that the area of a circle varies with the square of the radius.

The increase in supply of land will tend to satiate demand to the extent that land not suited to a particular use will no longer be forced into that use. In short, the tendency should be to have the land cost become a smaller and smaller factor in development costs. Developers, because of this and other factors, are beginning to think in terms of saleability by amenity of environment, location and other qualities that are inherent in good planning and the proper use of land for its best purpose.

Symptoms of land speculation due to the expressway development are in evidence in the Study Area.

Certain sales since the war of land near King of Prussia (to the north and south) have shown increases of 100% to 150% in price. One sizeable parcel of land immediately adjoining the King of Prussia cloverleaf has been withdrawn completely from the market, reportedly awaiting a more speculative price.

On the other hand, several of the large estates have been placed on the market because of their proximity to the expressway

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\* Davenport, H. J., "The Economics of Enterprise," 1913, p. 170.

right of way and the feared annoyance from the expected heavy traffic. However, according to several local real estate men, ready buyers have taken up these parcels at a good price with no hesitation.

With the development of the total expressway pattern for the metropolitan area, the speculative value of new land brought into the market should gradually lessen, and grow to be a smaller factor in the total picture of development costs.

## PART II - LAND ALLOCATION

The sections that follow are devoted to analyses of future industrial and population growth in the Philadelphia Metropolitan District, and the impact of this growth in terms of land required for major uses in the Study Area.

Sound industrial development, because of the strategic location of the area, is the primary locational concern. Determination of future population and location of living areas in relation to work is the next major consideration. These two factors will in turn decide the character of residential areas and open spaces for active and passive recreation.

### INDUSTRY

#### Future Industry Trend

There are two major factors that will determine the future industrial growth in the Philadelphia Metropolitan District. One is the estimated absolute growth in the labor force; and the other, the industrial decentralization within the Metropolitan District.

The future growth of the labor force has been studied by the Philadelphia City Planning Commission.\* The estimate for the Philadelphia Metropolitan Area, based on the total population growth, is a total labor force of 1,840,000 in 1980. This figure represents an increase of approximately 30% between 1940 and 1980. Between March, 1940 and March, 1949 the Philadelphia labor market increased 17%. An additional 13% after 1950 is predicted. In 1949 the labor force

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\* Philadelphia City Planning Commission, "Economic Base Study," August 1949.

comprised 45.5% of the population. An increase to 46.6% is expected by 1980.\*

More important to the Study Area is the future decentralization of industry.

The Philadelphia City Planning Commission has developed an analysis of estimated 1980 industrial decentralization in the Philadelphia Metropolitan District.\*\* The study is based on a total of 600,000 labor force employed in manufacturing in 1980, determined by labor force estimates covered in the previous section. The prediction of workers and area required by industry for 1980 was developed from a study of the trends in increasing land requirements per worker for industry and a detailed analysis of existing industrial districts in the Philadelphia Metropolitan District.

The conclusions established by this study are best visualized in Plate 6. Of the total net increase in area of industrial districts of 13,308 acres, 41.1%, or 5,503 acres, will be inside and 58.9%, or 7,895 acres, will be outside the city. The percentage distribution of total acreage in industrial use in 1945 was 49.3% inside and 50.7% outside. In 1980 this relationship will be 43.2% and 56.8% respectively.

In Pennsylvania, outside the city, the net increase in area is relatively small, 31.1%. This is based on the elimination or reclamation of large areas occupied in 1945 by quarries and the elimination

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\* Philadelphia City Planning Commission, "Economic Base Study," August 1949, page 23.

\*\* Philadelphia City Planning Commission, "Future Industrial Land Use in Metropolitan Philadelphia," unpublished.

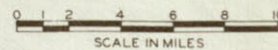
# INDUSTRIAL DISTRICTS - EXISTING AND PROPOSED



## LEGEND

- AREAS OCCUPIED BY INDUSTRY GRADUALLY TO BE DEVELOPED FOR ANOTHER USE.
- AREAS OCCUPIED BY INDUSTRY TO BE CONTINUED IN INDUSTRIAL USE.
- AREAS NOW NON-INDUSTRIAL SUGGESTED FOR INDUSTRIAL USE.

PHILADELPHIA METROPOLITAN DISTRICT  
PHILADELPHIA CITY PLANNING COMMISSION





of the ammunition dump on Hog Island (890 acres) for the expansion of the Southwest Airport. On the other hand, a sizeable increase in employment (12.5), because of the increase in manufacturing areas, is expected by 1980.

In New Jersey, where most of the increased area will be used by the oil industry or by similar low ratio of workers per acre industry, the increase in employment (20.1%) is small compared to the 134.1% increase in area.

The employment picture is also expected to change. In 1943, 60.6% of total employment was inside and 39.4% was outside. In 1980, 53.8% will be inside, while 46.2% will be outside the city. The 1980 percentage of employment in manufacturing for the area outside the city of 46.2% will be 29.5% in New Jersey and 16.7% in Pennsylvania.

#### Industrial Growth for Norristown, Bridgeport Area

The Philadelphia City Planning Commission has estimated a total labor force in manufacturing of 33,140 workers in the Norristown, Bridgeport area by 1980.\* This total represents an increase of 178% from the 18,558 manufacturing workers in 1943.\*\* Plate 6 shows the now non-industrial areas that have been suggested for industrial development. This study differs considerably from this proposal which has influenced the estimated distribution of population for 1980. See Plate 11.)

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\* Philadelphia City Planning Commission, "Future Industrial Land Use in Metropolitan Philadelphia," unpublished.  
 \*\*ibid.



## INDUSTRY - NORRISTOWN, BRIDGEPORT AREA

The following analysis presents the existing industrial districts of the Norristown, Bridgeport Area. The principles of future industrial expansion and location are discussed, and in the last section these principles are applied to determine the future industrial districts in the Study Area.

### Existing Industrial Districts

There are seven industrial districts located at the intersection of the Chester Whitemarsh Valley with the Schuylkill River Valley. Only one district, Upper Merion, is completely in the Study Area. The remaining districts are located along or divided by the Schuylkill River.

The source of employment data for the following sections was the "Industrial Directory of the Commonwealth of Pennsylvania, 1943," Bureau of Statistics, Department of Internal Affairs, as presented in the Philadelphia City Planning Commission Study, "Future Industrial Land Use in Metropolitan Philadelphia," unpublished.

Areas for industrial districts outside the Study Area originated in the above mentioned Planning Commission Study, based on a survey made of industrial districts in the Philadelphia Metropolitan Area in 1945. The areas inside the Study Area were corrected by aerial photographs and field trips and represent 1950 data. Appendix "A" presents a detailed breakdown of each industrial district by industry in the Study Area and compares the 1943 and 1947 employment.

0. Conshohocken Industrial District

**Location:** Discontinuous in Conshohocken and West Conshohocken. The main concentration is east of Conshohocken proper on a site restricted by the Pennsylvania and Reading Railroads to the north and the Schuylkill River to the south, limiting expansion.

**Area:** 155 acres.

**Employment:** 5066.

**Character:** Old industrial district of predominantly heavy industry, concentrating in boilers, electrical construction and rubber tires.

**Nuisances:** Noise from heavy industry and congestion caused by trucking.

**Freight Transportation:** Served by Pennsylvania and Reading Railroad, Schuylkill Valley lines.

**Trucking:** On local streets with steep grades, inadequate.

**Transit:** By suburban trains on Reading and Pennsylvania Railroads, supplemented by buses.

**Surrounding Area:** Residential land with few vacant lots.

1. Swedeland Industrial District

Location: On both banks of Schuylkill, between Conshohocken and Norristown in Plymouth and Upper Merion Townships.

Area: 433 acres (350 acres of total located in Study Area).

Employment: 2,959 (1,625 workers employed in Study Area).

Character: Heavy industrial district dominated by Alan Wood Steel Works, the only primary metallurgical plant in the region.

Nuisances: Considerable noise and smoke from iron and steel works.

Freight Transportation: Served by Pennsylvania Railroad "Trenton cutoff" via a siding shown in Plate 12. Also served by Pennsylvania and Reading Schuylkill Valley lines.

Trucking: On Swedeland Road and Conshohocken Road.

Transit: By Pennsylvania and Reading Suburban lines and bus.

Surrounding Area: Open land, undulating to hilly.

## 2. Upper Merion Industrial District

Location: Discontinuous in Upper Merion Township.

Area: 238 acres.

Employment: 776

Character: Big limestone quarry of Bethlehem Steel Company and scattered small plants. The Bethlehem mine has caused a serious blight, not only the mine itself with noise and dust, but the tailing dump to the west of Route 202 is an eyesore at the gateway to Bridgeport.

Nuisances: Heavy dust and noise from quarry, plus eyesore of quarry and tailing dump.

Freight Transportation: Served by Pennsylvania Railroad "Trenton cutoff" and Plymouth branch of Reading Railroad.

Trucking: On Route 202.

Transit: Philadelphia and Western Trolley and suburban buses.

Surrounding Area: Vacant land.

### 3. Norristown-Bridgeport Waterfront Industrial District

Location: In Norristown and Bridgeport along both banks of Schuylkill River.

Area: 288 acres (40 acres, not including 19 acres of Reading Railroad, in Bridgeport).

Employment: 7,352 (4,494 workers employed in Bridgeport).

Character: Mixed industrial district, mostly old, small and medium sized plants. In Bridgeport, James Lees and Sons Co., employing 1,806 workers, occupies a relatively new 4-story building near the east borough line and is the dominant industry.

Nuisances: Mainly trucking congestion, now intensified by presence of Tose, a large "over-the-road" trucking concern.

Freight Transportation: Served by Pennsylvania Railroad and Reading Schuylkill Valley Lines.

Trucking: On Routes 202 and 422, inadequate.

Transit: Suburban trains on Pennsylvania and Reading Railroad and on Philadelphia and Western and Lehigh Valley Transit lines, and on local Norristown and suburban buses.

Surrounding Area: Commercial and blighted and near blighted residential land. A few vacant lots.



#### 4. Norristown, Stoney Creek Industrial District

Location: Along both banks of Stoney Creek in Norristown.

Area: 50 acres.

Employment: 1,378

Character: Mostly small and medium sized plants, including printing offices of "Norristown Times Herald."

Nuisances: Trucking congestion.

Freight Transportation: Pennsylvania Stoney Creek Railroad Branch.

Trucking: On Route 422 (Main Street, Norristown).

Transit: Philadelphia and Western and local Norristown and suburban buses.

Surrounding Area: Dense residential development with park on north end, limiting expansion.

## 5. West Norristown Industrial District

Location: Discontinuous in dense residential area  
of western section of Norristown.

Area: 25 acres.

Employment: 633

Character: Old small and medium sized plants  
interspersed in residential area.

Nuisances: Heavy trucking and noise.

Freight Transportation: Served only by trucking over small  
residential streets.

Transit: Norristown and suburban buses.

Surrounding Area: Near blighted residential area with  
several vacant lots.

## 6. Valley Forge - Abrams Industrial District

Location: Discontinuous on both banks of Schuylkill River.

Area: 228 acres.

Employment: 912

Character: Two dilapidated plants, plus one, the new Taylor Fibre Company, manufacturing plastic, which is a model of well-kept grounds and structures.

Nuisances: Heavy dust from quarry and refractory works. Quarry in Valley Forge Park not only an eyesore for a national shrine, but a source of pollution for the Schuylkill River.

Freight Transportation: Served by Schuylkill Valley Line of Reading Railroad on south bank, and the north bank served by the Pennsylvania Valley Line.

Trucking: On Route 363.

Transit: Infrequent service on Reading and Pennsylvania Railroad Lines, and by bus.

Surrounding Area: Open land, undulating to hilly.

Principles of Future Industrial Expansion and Location

There are trends, technological, social and economic, plus growing planning controls, that will shape not only the changing industrial processes but also the location of the areas of work.

Technological changes in industry have tended to increase the area per worker. Increased mechanization and motive power per worker, clear span and single-story plants to get maximum flexibility of production line techniques, greater demands for parking and terminal areas for trucks and workers' cars, are standard requirements for many plants today. In addition, increased areas for worker recreation and welfare, plus landscaping of plant grounds, have been increasing. These factors have tended to decrease the number of workers per acre and will continue to in the future.

The Tri-State Regional Plan gave the following data on industrial area and employment for the eight counties of the Philadelphia

Metropolitan Area.\*

\*The Regional Plan of the Phila. Tri-State District, Phila., 1932, p. 381.

Table 2

Industrial Area and Employment in  
Philadelphia Metropolitan Area,\*\*  
for Three Major Divisions of P.M.A., 1929/30.

	Acres 1930	Industrial Wage Earners 1929	Average Workers Per Acre
4 Counties in Pennsylvania	4,147***	83,309	20.1
3 Counties in New Jersey	2,496	45,844	18.4
7 Counties surrounding Philadelphia	6,643	129,153	19.4
Philadelphia	4,460	244,655	54.8
8 Counties of P.M.A.	11,103	373,808	33.7

\*\* Philadelphia, Bucks, Chester, Delaware and Montgomery in Pennsylvania, and Burlington, Camden and Gloucester in New Jersey.

\*\*\* Excludes 590 acres in sand and gravel pits in Bucks County.

According to a further analysis by the Philadelphia City Planning Commission\* of this trend within Philadelphia over a period of 1910, 1930 and 1944, "in these 34 years prior to 1944, the gross industrial area has tripled, and the average area per worker has doubled."

The industrial development in the Study Area will be general manufacturing. All computations for light manufacturing districts were based on twenty workers per acre. This is a rule of thumb, but in keeping with the general trend.

Labor relations have assumed increasing importance. Management is striving to incorporate all facilities into plant layout and location that will improve morale and prevent costly disruption of production. It is interesting to note that, with a few minor exceptions of slight additions, the older industrial districts around Norristown have no new construction. The two principal examples of recent industrial construction occur where the industry could create and control the environment. These examples are the huge, modern, landscaped Philadelphia Electric plant on Barbadoes Island, and the Taylor Fibre Company that settled at an admittedly poor location from the standpoint of accessibility, but excellent for pleasant approaches and surroundings.

Albert Kahn, a leading industrial plant designer, makes this same point in an article.\*\* "Not for reasons of swank but for better public relations and more pride of the community in its work."

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\* Philadelphia City Planning Commission, "Future Industrial Land Use in Metropolitan Philadelphia," unpublished.

\*\* Albert Kahn Assoc. Architects and Engineers Inc., Architectural Record, November 1945.



Continuing, he states, "...further development of pleasant landscaping around factories, an agreeable scene, a fit environment for the day's work....suggests that the owner is contributing to health, wealth, happiness and enjoys doing it."

Enlightened planning policy will also affect distribution of work centers. Industrialists will be advised to select sites which will be serviced by adequate roads that do not affect residential areas and, in addition, will provide ample area for parking, landscaping and future expansion. Sites will be recommended that do not increase existing congestion in intensely developed areas. The remaining open lots in old industrial districts will be needed for the growing parking and landscape requirements of existing industry. A 100% building coverage on these vacant lots would jeopardize the very future of these industries.

In addition, workers' housing, which is becoming increasingly important to industrialists as well as planners, is being gradually disentangled from industrial uses. Moving new industries into the old industrial districts would only aggravate this problem.

Finally, the plan must furnish a variety of industrial sites that have different sizes and specifications to fit the particular operations and policies of a broad range of concerns. A sufficient reserve of industrial land will tend to keep a competitive and, therefore, a low price for sites, offering an inducement to new industrial location and the expansion or relocation of existing plants.

The 1943 data used in the previous analysis of industrial districts was under the impact of a war economy. The shortage of

resources demanded that marginal plants and equipment be used as intensively as possible. The number of workers employed in the old industrial districts, therefore, should be taken more or less as a maximum.

#### Distribution Within Norristown, Bridgeport Area

The future industrial development in the Study Area is comprised of 51.6% of the 1980 labor force employed in manufacturing, estimated for the entire Norristown, Bridgeport Area. In 1943, the labor force in manufacturing in the Study Area was only 46% of the total. This reversal of the distribution of workers in manufacturing is based on the following factors:

(1) The Pennsylvania Turnpike will draw industry toward it in the future. Many industries that locate in the Norristown, Bridgeport Area will be oriented to trucking for servicing and/or distribution on the Turnpike. In addition, the Turnpike will soon be a reality and the Outer Belt Expressway that would serve the other industrial areas has not yet been scheduled.

(2) The Transcontinental Gas Transmission Line (a 10" feeder from the main 30" line) now under construction, with completion set for this year, will run through the Study Area to the Philadelphia Electric storage and distribution tanks located to the west of West Conshohocken.\* Distribution to industry on the same side of the Schuylkill River will be more logical and cheaper.

(3) Some of the now open land between Norristown and Conshohocken should remain open for parks and playgrounds, and not be solidly built up with industry.

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\* Fish Construction Co., Houston, Texas, with local office in Bridgeport, contractors for Transcontinental Gas Transmission Line.

(4) Both areas are equally well served by rail, high tension electrical lines, and have equal access to the Schuylkill River (which is being freed from existing pollution) for a water supply.

Table 3 shows the proposed detailed distribution of workers in manufacturing in the seven industrial districts of the Norristown, Bridgeport Area and compares these proposals with the previous estimates of the Philadelphia City Planning Commission.

#### Future Industrial Districts in Study Area

Plate 1 shows the proposed industrial development for the Study Area. The central core is a broad based wedge with the base on the Schuylkill River and the apex reaching toward the King of Prussia cloverleaf of the Pennsylvania Turnpike. Table 4 shows the area in acres of the existing industrial districts and the proposed expansion for 1980. Plate 13 shows this information graphically.

#### 1. Swedeland Industrial District

It is proposed to create an industrial estate of 325 acres of light manufacturing. A 45-acre increase for the heavy industrial district is also recommended. This proposed light manufacturing area can be readily served by railroad sidings from the principal Pennsylvania Railroad's siding from the "Trenton cutoff." The proposed trucking service road, connecting Route 202 to the Swedeland Road (dashed in Plate 1), is mandatory for development of the site and will eliminate heavy trucking from passing through the inadequate streets of Bridgeport. Fifty acres have been set aside for truck

TABLE 3.

INDUSTRIAL DISTRICTS IN NORRISTOWN, BRIDGEPORT AREA  
1943 EMPLOYMENT AND PROPOSED 1980\*

District		Workers 1943	Workers 1947	% 1943 to 1947	Workers unemployed from change in land use	P.C.P.C. Estimate		Estimate Study Area	
No.	Name					Workers 1980	Change 1943 to '80	Workers 1980	Change 1943 to '80
0.	Conshohocken	5,066				5,500	+ 434	5,500	+ 434
1.	Swedeland	2,959			- 135 <sup>1</sup>	13,860	+10,901	13,740	+10,781
2.	Upper Merion	776	727		- 139 <sup>2</sup>	0	- 258	4,500	+ 3,724
3.	Norristown	2,340				)- 10,200	+ 2,848	3,000	+ 660
	Bridgeport	4,494	4,281					4,500	+ 6
4.	Norristown								
	Stoney Creek	1,378				2,500	+ 1,122	1,300	- 78
5.	W. Norristown	633				0	- 633	0	- 633
6.	Valley Forge								
	Abrams	912	873		- 387 <sup>3</sup>	1,080	+ 168	600	- 312
		18,558				33,140	14,682	33,140	14,682

1. Valley Forge Cement Co. - dropped to 95 workers in 1947.

2. Bethlehem Steel Co. Quarry

3. Ehret Magnesia Mfg. Co. and Refractory and Insulation Corp. - dropped to 333 in 1947.

\* Excludes workers employed in transportation and warehousing.

INDUSTRIAL DISTRICTS IN STUDY AREA

AREA IN ACRES, AS OF 1950 AND AS PLANNED FOR 1980

Table 4

District		Existing Continued		Area Continued Different Industrial Use		Area Discontinued		Proposed		Total - 1980	
No.	Name	Acres	Workers*	Acres	Workers*	Acres	Workers*	Acres	Workers	Acres	Workers*
1.	Swedeland	280	1,490			70	135	370 <sup>3</sup>	5,500	650	6,990
2.	Upper Merion	57	637	44	880	130	139	149	2,980	250	4,500
3.	Bridgeport	60 <sup>1</sup>	4,494							60	5,000
6.	Valley-Forge-Abrams	65 <sup>2</sup>	387			65	387				600
Total		462	7,008	44	880	265	661	519	8,480	960	17,090

\* Col. 1, Table 3; note only Swedeland workers in Study Area are included. (See Appendix A.)

1 Includes 19 acres Reading Railroad roundhouse and switching yard.

2 Includes only industrial acreage south side of river, excluding Reading Railroad Abram's classification yard.

3 Includes 45 acres "heavy industry," plus reduction for "over-the-road" trucking terminals.



yards for idle equipment and warehouses. This estimate was based on one-half the area for warehousing and half for trucks. The high speed trolley line of the Philadelphia Western Railroad Company, tapping the labor forces of Philadelphia and 69th Street, in addition to local buses, will serve the area.

It is hoped that the Quarry and Cement Plant will be discontinued. The area between there and Gulf Mills is ripe for high-type residential development, and the blighting effect of this industry far outweighs its economic value.

## 2. Upper Merion Industrial District

The proposed 130 acre light industrial estate toward King of Prussia (See Plate 13) is earmarked for a "campus plan" type light industry, such as "Electronics Park" for General Electric Company, Syracuse, New York, or Johns-Manville Corp., Bound Brook, New Jersey.\*

The limestone quarry of Bethlehem Steel Company is shown abandoned (Plate 13). The quarry is becoming uneconomical to operate because of excessive ground water, and future expansion is limited by the railroads. Forty-four acres of this land now occupied by gravel and sand piles can be reused for light manufacturing. The blighting 59-acre tailing dump to the north of Route 202 is recommended to be reforested with black locust or red oak at an approximate cost of less than \$5,000.\*\* This recommendation not only changes an eyesore into an attractive green area, but also would prevent wash and erosion from the dump into the Schuylkill River.

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\* Architectural Record, November 1945, page 81.

\*\* Source of tree types and cost: W. P. Moll, District Forester, Department of Forests and Waters, Norristown.



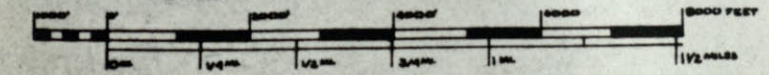
LEGEND

- EXISTING
- CHANGE OF IND. USE
- ABANDONED
- PROPOSED
- IMPOUNDING BASINS

BASE MAP LEGEND

- |                    |                          |
|--------------------|--------------------------|
| ESTATE             | PUBLIC, SEMI-PUBLIC LAND |
| A RESIDENCE        | CEMETARY                 |
| B RESIDENCE        | DENSELY WOODED           |
| BLIGHTED RESIDENCE | ORCHARD                  |
| BUSINESS           | NURSERY                  |
| SCHOOLS            | ABANDONED QUARRY         |
| CHURCHES           | PENNSYLVANIA TURNPIKE    |
| INDUSTRY           | VALLEY FORGE EXPRESSWAY  |
| IMPOUNDING BASINS  |                          |

SCALE



DAVID D. LONGMAID

M.C.P. THESIS, SPRING 1950

MASS. INSTITUTE OF TECHNOLOGY

INDUSTRIAL LAND





### 3. Bridgeport Industrial District

Development of an adequate truck service road is proposed from the Swedeland area. However, it is recommended that traffic generators, such as Tose, a large "over-the-road" trucking concern, be relegated to the proposed industrial district in Swedeland. The damage caused by heavy trucking to residential areas and proper servicing of existing industry will in the long run write off any temporary benefit that might be gained by the community.

### 6. Valley Forge - Abrams Industrial District

Elimination of the industry in Valley Forge Park and the other industry east of the park for expansion of the park area (See Recreation Section) is recommended. The large North Abrams Impounding Basin is recommended for a future playground. The Reading Railroad classification yard at Abrams is kept and probably will expand. The increased use of diesel in railroad operation will gradually eliminate the nuisance of soot from the coal burners. The two small impounding basins adjacent to the yard will continue in the future for maintenance dredging of the Schuylkill River.\*

## POPULATION

### Future Population Trend

The future long-term trend of population growth in the Philadelphia Metropolitan Area has been estimated by the Philadelphia City Planning Commission.\*\* The total estimated population of this area

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\* Source: Wm. M. Black, Managing Engineer, Schuylkill River Project, Department of Forest and Waters, Philadelphia.

\*\* Philadelphia City Planning Commission, "Population Estimates 1950-2000, Philadelphia-Camden Area," 1948.

will reach a maximum of 3,943,000 persons by 1980. This represents a 23% increase over the 1940 census figure of 3,199,637. About four-fifths of this total increment will have been attained by 1960. The rate of growth will decrease quite rapidly from decade to decade after this date, and possibly decline after 1980.

Even more important to the future growth of the Study Area is the decentralization trend in Philadelphia proper toward the suburbs. The following table estimating this trend has been made by the Philadelphia City Planning Commission.

Table 5

Population of Philadelphia, 1860 to 1940  
and Estimated for 1980 for 3 Areas

Area	1890	1900	1900 as % 1860	1940	1940 as % 1900	1980	1980 as % 1940
A	33,265	274,406	725%	142,857	- 47%	75,000	-47.7%
B	193,106	908,585	370%	1,345,779	+ 98%	927,000	-31.1%
C	41,158	110,706	169%	442,698	300%	798,000	84.0%
City Total	565,529	1,293,697	129%	1,931,334	49.2%	1,800,000	- 6.8%

A - Old City, Wards 2-14, 16, 17

B - 2nd phase development, Wards 1, 15, 18-21, 24-34,  
36-40, 43-48, 51, 52

C- Mostly undeveloped land, Wards 22, 23, 35, 41, 42, 49, 50

Source: Philadelphia City Planning Commission, "Expected Population Change, 1940-1980," unpublished.

The total decentralization pattern estimated by the Philadelphia City Planning Commission is shown in Plates 7, 8 and 9. The estimated population for the area (including the Study Area plus West Conshohocken, Norriton, West Norriton, East Norriton, Norristown, Plymouth and Conshohocken) is estimated at 144,000 in 1980, a gain of 97.8% over the 1940 population of 10,458.\* The Philadelphia Planning Commission has also made a spot map of the population distribution for 1940 and 1980. (See Plates 10 and 11.)

Both these predictions were based on the following factors:

- (1) Total buildable land, minus
  - (a) land for park and recreational use;
  - (b) land for industrial use.
- (2) Employment opportunities in 1980.

The population proposed for the Study Area was based on the future industrial growth taking place on the Norristown side of the Schuylkill River and, therefore, no longer is applicable.

#### Factors of Future Population for Study Area

The population of the Study Area, since its function in the future is visualized as an industrial satellite of Philadelphia, will depend on the labor force in manufacturing. In order to arrive at a reasonable estimate, it is first necessary to establish the percentage relationships of labor force in manufacturing to total labor force and then to population required to support this labor force.

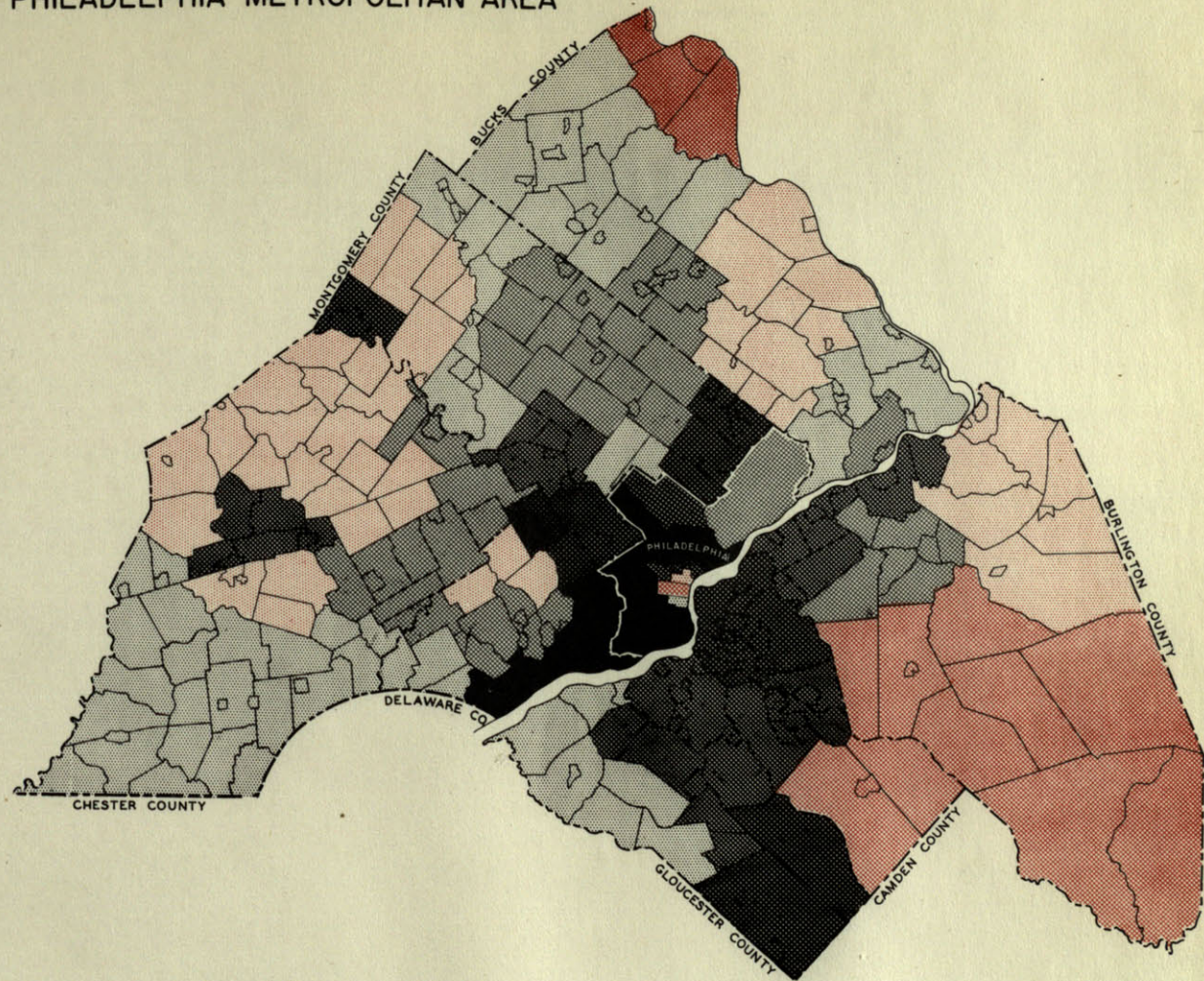
Labor force as per cent of total population is one of the most stable elements in the labor market. In the "Economic Base Study,"

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\* Philadelphia City Planning Commission, "Expected Population Change, 1940-1980," unpublished.



# POPULATION CHANGE, 1860-1900 PHILADELPHIA METROPOLITAN AREA



## PERCENT INCREASE 1860-1900

OVER 300 %
150 TO 299 %
100 TO 149 %
50 TO 99 %
0 TO 49 %

## PERCENT DECREASE

0 TO 24 %
25 % OR MORE

--- COUNTY BOUNDARY  
— MINOR CIVIL DIVISIONS

AVERAGE INCREASE  
IN CITY 128.8  
OUTSIDE CITY 75.8  
TOTAL P.M.A. 108.8

NOTE: POPULATION CHANGES ARE SUMMARIZED  
FOR 11 AREAS IN PHILADELPHIA AND FOR  
53 AREAS IN 7 SURROUNDING COUNTIES

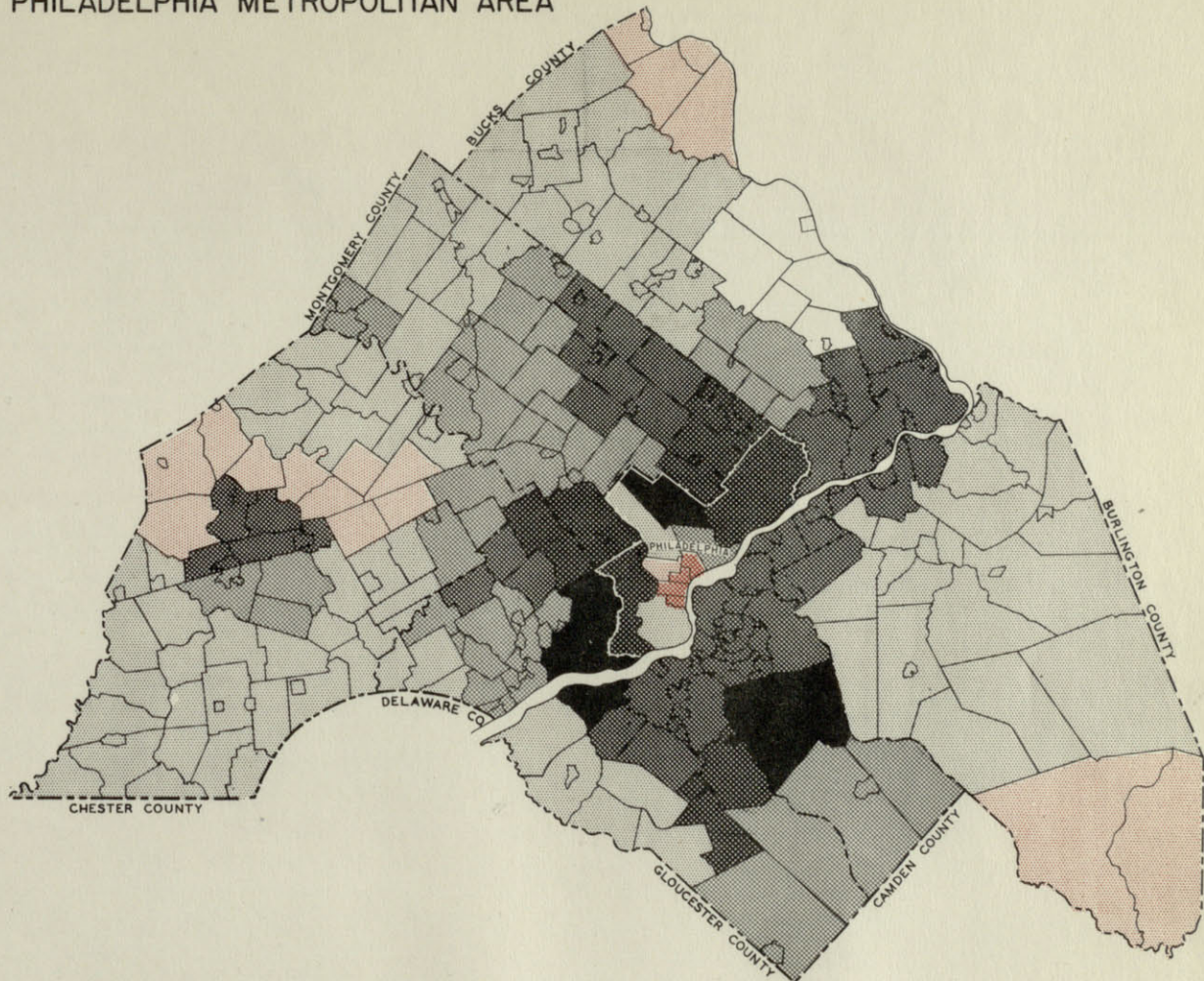
SOURCE: U.S. CENSUS



PHILADELPHIA CITY PLANNING COMMISSION  
SCALE IN MILES  
OCTOBER, 1949



# POPULATION CHANGE, 1900-1940 PHILADELPHIA METROPOLITAN AREA



## PERCENT INCREASE 1900-1940

OVER 300%
150 TO 299%
100 TO 149%
50 TO 99%
0 TO 49%

## PERCENT DECREASE

0 TO 24%
25% OR MORE

## AVERAGE INCREASE

IN CITY	49.3
OUTSIDE CITY	114.9
TOTAL P.M.A.	69.1

NOTE: POPULATION CHANGES ARE SUMMARIZED  
FOR 11 AREAS IN PHILADELPHIA AND FOR  
53 AREAS IN 7 SURROUNDING COUNTIES

--- COUNTY BOUNDARY  
— MINOR CIVIL DIVISIONS

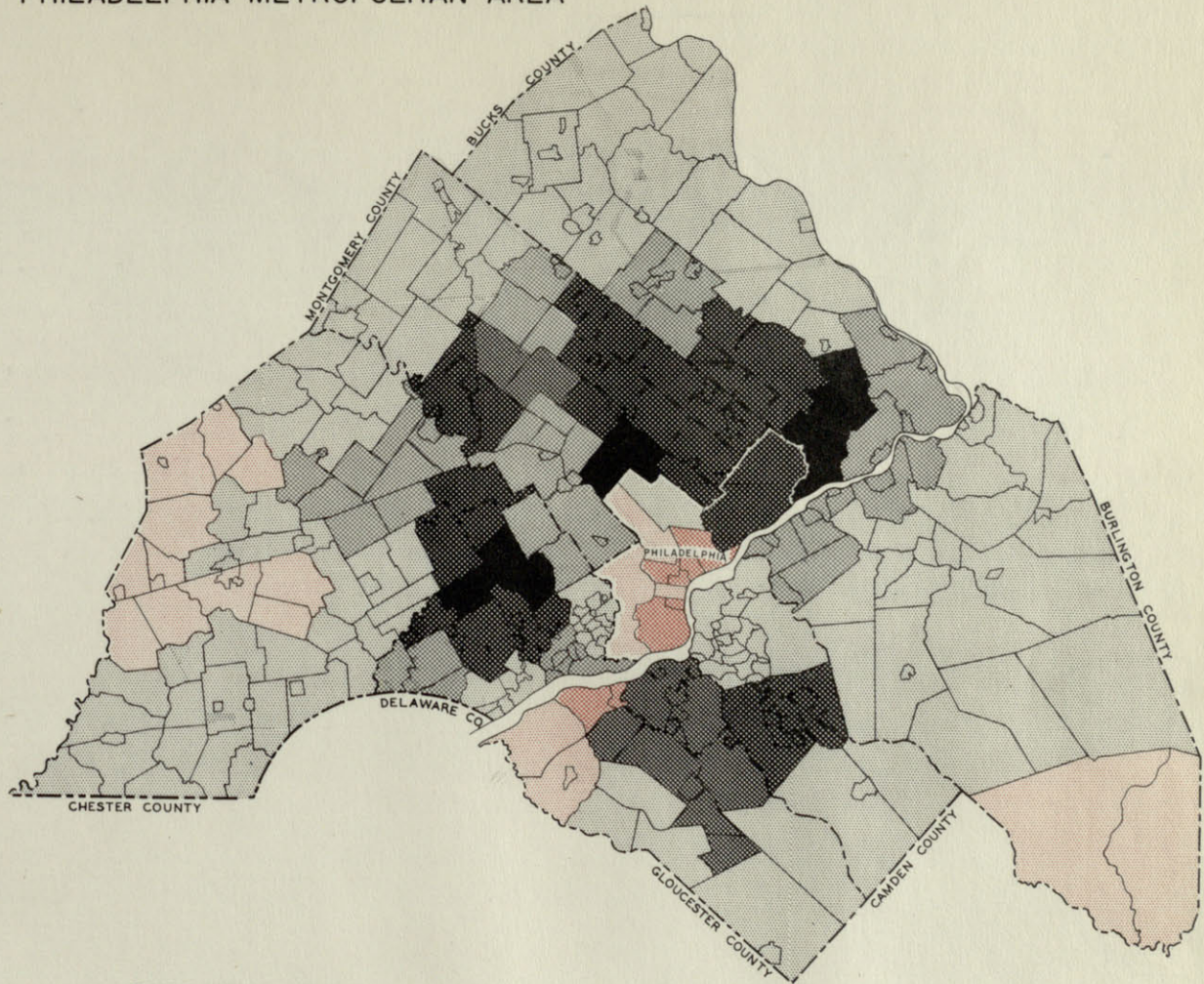


PHILADELPHIA CITY PLANNING COMMISSION  
SCALE IN MILES  
OCTOBER, 1949

SOURCE: U.S. CENSUS



# EXPECTED POPULATION CHANGE, 1940-1980 PHILADELPHIA METROPOLITAN AREA



## PERCENT INCREASE 1940-1980

OVER 300%
150 TO 299%
100 TO 149%
50 TO 99%
0 TO 49%

## PERCENT DECREASE

0 TO 24%
25% OR MORE

## AVERAGE INCREASE

IN CITY	-6.8
OUTSIDE CITY	72.6
TOTAL P.M.A.	24.6

NOTE: POPULATION CHANGES ARE SUMMARIZED FOR 11 AREAS IN PHILADELPHIA AND FOR 53 AREAS IN 7 SURROUNDING COUNTIES

--- COUNTY BOUNDARY  
— MINOR CIVIL DIVISIONS

SOURCE: ESTIMATES BY PHILADELPHIA CITY PLANNING COMMISSION



PHILADELPHIA CITY PLANNING COMMISSION

SCALE IN MILES 0 5 10 15 20 25  
OCTOBER, 1949



# DISTRIBUTION OF TOTAL POPULATION 1940



EACH DOT REPRESENTS 100 PERSONS

PHILADELPHIA METROPOLITAN DISTRICT  
PHILADELPHIA CITY PLANNING COMMISSION

0 1 2 4 6 8 10  
SCALE IN MILES

JUNE-1945

SOURCE OF DATA: U.S. CENSUS - 1940



**DISTRIBUTION OF POPULATION  
PHILADELPHIA METROPOLITAN DISTRICT 1980**



PHILADELPHIA CITY PLANNING COMMISSION



the Philadelphia City Planning Commission states: "The peacetime propensity (to be in the labor force) is based not upon mere impulse but upon deeply rooted habits, on size and composition of families, on institutions of child care, education, old age dependence, concentration of population and structure and location of industry."\*

The following table of labor force as per cent of total population compares certain key areas.

Table 6

Labor Force\*\*as a Per Cent of Total Population  
and of Population 14 Years and Over, 1940.

Area	Total Population	Population 14 yrs. & over	Labor Force	% of Total Pop.	% of Pop. 14 yrs. & over
Pennsylvania	9,900,180	7,693,214	3,986,000	40.3	51.8
Philadelphia	2,898,644	2,325,431	1,284,149	44.3	55.2
Norristown	38,181	31,065	14,857	39.0	48.0
Bridgeport	5,904	4,417	2,495	42.4	56.5

Source: U. S. Bureau of the Census, 16th Census of U. S., 1940, Population, Vol. II, "Characteristics of the Population," Part 6.

\*\* The Census determined the labor force by activity during the last week of March, 1940, and includes only persons who are working, or with a job, or seeking work in that week.

The future labor force as a percentage of total population is estimated to fall between the Norristown and Bridgeport percentages of the table above, or approximately 41% for 1940. An increase to 43% is expected by 1980. This prediction, considerably lower than Philadelphia's 44.3% in 1940 or the 47% predicted for 1980, is based

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\* Philadelphia City Planning Commission, "Economic Base Study," August 1949, page 11.

on the following factors:

(1) The continuance of trend to have large families with several children in suburban areas (See Family Size and Composition in Residential Section) will continue. Bridgeport in the above table has 25% of population under 14 years of age; Philadelphia has only 19.5%. This phenomena is the main cause for the lower percentage of labor force in the outlying areas.

(2) The percentage of females in gainful employment is not expected to increase. Norristown and Bridgeport have 30.2% and 30.8% respectively of females in the labor force. This compares to 30.8% for Philadelphia and 26.0% for the environs.\* This percentage is not expected to increase in the proposed industrial development, even though the future industrial growth will be in light general manufacturing.

(3) The increase in the proportion of aged will be more pronounced in the central areas than in the suburban areas. However, this factor should tend to slightly offset the increased percentage of labor force to total population.

(4) The increase of average age in which young men enter the labor force will tend to lower the percentage. Greater industrialization in the area, coupled with the decrease in opportunities for unskilled labor (i.e., quarries, farm labor) will tend to lower percentage.

The labor force employed in manufacturing varies and is dependent on the economic background of the particular period. According to the

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\* Source: Philadelphia City Planning Commission, "Economic Base Study," August 1949, Table VIII, page 69, and U. S. Bureau of Census, 16th Census of U. S., 1940, "Current Population Reports, Labor Force."

"Economic Base Study" made by the Philadelphia City Planning Commission: "Manufacturing industries in the Philadelphia labor market accounted for nearly half of all employment at the peak of the war effort. The ratio in 1948 amounted to 38%, and in March 1949 it had fallen to the prewar peacetime norm of 37%."\*

The percentage for the Study Area is expected to be higher than Philadelphia's. An analysis of total 1940 population for Norristown and environs\*\*as a percentage of total labor force, as percentage of labor force in manufacturing in 1943, showed 62% of the labor force in manufacturing. 1943 was under the duress of a war economy and also the data is not comparable to the 1940 population. However, 39% of total labor force, for labor force in manufacturing (a decline comparable to Philadelphia's) seems a reasonable estimate for normalcy.

#### Future Population in Study Area

The increase in population is dependent on the increase in industrial workers. The two marked increases affecting the Study Area are the Swedeland and Upper Merion Districts. It was assumed that the Bridgeport district, a deficit worker area, would continue to draw its labor force from Norristown. The remaining industry in the Valley Forge-Abrams district, employing 387 workers, would be supplied from communities on the north bank of the Schuylkill River. Table 7 shows the estimated population increase to support the 1980 labor force in manufacturing.

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\* Philadelphia City Planning Commission, "Economic Base Study," August 1949, p. 18, 20.

\*\* Area includes: Study Area, plus West Conshohocken, Norriton, West Norriton, East Norriton, Norristown, Plymouth and Conshohocken.

Table 7

Population Increase for Increase  
in Manufacturing Labor Force

No.	District Name	Net Increase in Mfg. Labor Force	Labor force in mfg. 49% of labor force <sup>3</sup>	Labor Force	Labor force 43% of population <sup>3</sup>	1980 Population Increase
1.	Swedeland	3,480 <sup>1</sup>		7,100		16,500
2.	Upper Merion	3,860 <sup>2</sup>		7,900		18,400

- 1 Net increase of 5,225 workers = 5,500 (Col. 4, Table 4)  
minus 274 (Col. 3, Table 4).

Note: The deficit of 1,745 workers is assumed to  
commute via Philadelphia Western and car.

- 2 Net increase of 3,860 workers = 880 (Col. 2, Table 4)  
plus 2,980 (Col. 4, Table 4).

- 3 See text.

The reliance on rapid transit and/or private car to supply an adequate number of workers is socially sound. The industries because of the flexibility of today's transport have the opportunity to select their labor force from broad areas, while the worker has the opportunity to select his job and place of work.

The following table presents the total population for the Study Area. The population reductions estimated for 1980 are based on redevelopment projects discussed in a later section.

Table 8  
Population, Study Area, 1940-1980

Area	1940	1980	Increase	Decrease
Bridgeport	5,904*	5,034		870
Upper Merion	6,143*	4,093 <sup>3</sup>		
Swedesburg <sup>1</sup>	1,100 <sup>2</sup>	0		1,100
Swedeland <sup>1</sup>	950 <sup>2</sup>	0		950
Community "A"		17,450 <sup>4</sup>	16,500	
Community "B"		20,370 <sup>5</sup>	18,400	
Total	12,047	46,947		

\* U. S. Bureau of the Census, 16th Census of U. S., 1940

1 Unincorporated blighted subdivisions of Upper Merion

2 Population (included in Upper Merion) based on gross density of Bridgeport. (Total built-up areas divided by total population = 34.8 persons per acre.)

3 4,093 = 6,143 - (1,100 + 950). Note: No estimate included for growth of residence south of Expressway or near Gulf Mills.

4 17,450 = 16,500 (Col. 5, Table 7) plus 950 (Swedeland)

5 20,370 = 18,400 (Col. 5, Table 7) plus 1,100 (Swedesburg) plus 870 (Bridgeport).

The total population for the Study Area in 1980, excluding residential growth south of the Valley Forge Expressway, is estimated at 47,000 persons. This represents a 390% increase compared to 1940 total population.



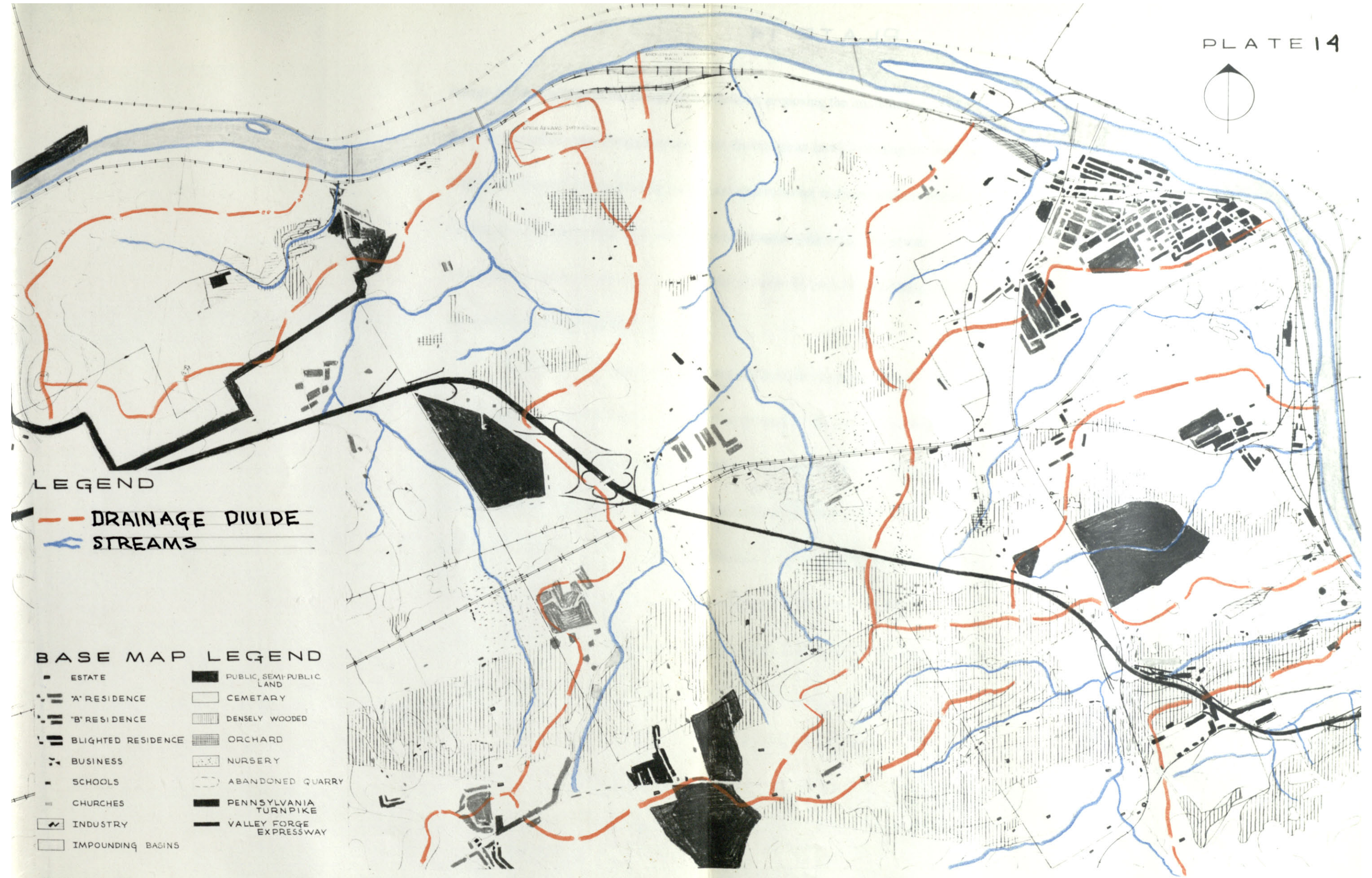
## RESIDENTIAL AREAS

This section deals with the location of residential areas, population distribution, and composition of the new and existing residential areas.

### Topography and Existing Barriers

Topography and existing man-made barriers have split the Study Area into three well-defined areas. (See Plate 14 for Natural Drainage Areas.) The location of the Pennsylvania Railroad's electrified "Trenton cutoff" and the Reading line paralleling it were based on natural grade conditions. These two rail lines with the 50,000 volt high tension line running just to the north of them cut the area completely in two. This barrier is reenforced by the two cemeteries, forming a green buffer, located to the south of the "Trenton cutoff" and existing Route 202 to the north. The proposed industrial wedge, located here to take maximum advantage of these existing facilities and the interchange with the Valley Forge Expressway at King of Prussia, will strengthen this barrier. The third natural area, the Borough of Bridgeport, is located in its own small drainage basin. It is separated from the other two sections by the high embankment of the "Trenton cutoff" to the southeast and a high hill to the southwest. The western side is shut in by the Bethlehem Mine tailing dump and the high tension line to the new Philadelphia Electric Plant on Barbadoes Island in the middle of the Schuylkill River. Bridgeport's site, sloping toward the Schuylkill River and Norristown on the





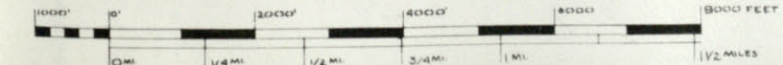
LEGEND

- DRAINAGE DIVIDE
- STREAMS

BASE MAP LEGEND

- |                      |                             |
|----------------------|-----------------------------|
| ■ ESTATE             | ■ PUBLIC, SEMI-PUBLIC LAND  |
| ■ 'A' RESIDENCE      | □ CEMETARY                  |
| ■ 'B' RESIDENCE      | ▨ DENSELY WOODED            |
| ■ BLIGHTED RESIDENCE | ▨ ORCHARD                   |
| ■ BUSINESS           | ▨ NURSERY                   |
| ■ SCHOOLS            | ○ ABANDONED QUARRY          |
| ■ CHURCHES           | ■ PENNSYLVANIA TURNPIKE     |
| ■ INDUSTRY           | --- VALLEY FORGE EXPRESSWAY |
| □ IMPOUNDING BASINS  |                             |

SCALE



NATURAL DRAINAGE BASINS



far bank, makes it a neighborhood unit of Norristown. Evidence of this is in the poorly developed shopping center in Bridgeport--a bank, a movie and a few grocery stores. The major community shopping occurs on Main and Dekalb Streets in Norristown.

#### New Communities

Two new communities are proposed. Bridgeport, on the other hand, in the planning sense will be considered a neighborhood unit of Norristown and separated by a densely wooded area (proposed) and the proposed industrial district in Swedeland. The two new communities, the one, "A," to the south of Bridgeport (population 17,450 persons), composed of three neighborhoods, and the other, "B," northeast of King of Prussia (population 20,370 persons), composed of four neighborhoods, will be separate entities in themselves. Plate 1 shows this.

Bridgeport, however, faces special problems. At present the town is heavily built up and the remaining open areas are unsuited to further development. Plate 1 shows four major recommendations:

- (1) Creation of a 13-acre park for workers in the center of the industrial district. This park will replace a blighted residential area.

- (2) Creation of a 40-acre park and playground buffer between the southeast Borough line and the Pennsylvania Railroad's "Trenton cutoff." This area, called Swedesburg and in Upper Merion Township, is blighted and unsanitary. There are no sanitary or storm sewers and the overflow from the cesspools is literally running down the gutters. Estimated displaced population will be 1,100, and will be relocated in new community "B."

(3) Creation of a centrally located shopping area, gradually pulling the commercial center away from the industrial area and Route 202.

(4) Gradual development of a green buffer between the industrial area and the residences.

The development of these new facilities in Bridgeport (excluding the redevelopment of Swedesburg) will displace an estimated 870 persons. Since these dwellings are blighted, aid from the Federal Housing Administration in the form of public housing could be requested.

There are two other areas that deserve special attention in Upper Merion. Swedeland at present is partially blighted and definitely subject to blight in the future. In Plate 1 this area has been earmarked for future redevelopment into industrial use. This proposal will displace an estimated 950 persons. These will be included in Community "A." The other area is the housing south of the intersection of Route 202 and the proposed industrial service road. This housing has been built since 1930 and represents an overflow from Bridgeport. Unfortunately it cannot expand to a full neighborhood because of its restricted location and consequently will be an awkward and uneconomical area to service with community facilities. Future expansion here should be discouraged.

#### Neighborhood Unit

The new communities in the Study Area are based on the neighborhood as the working unit.

The neighborhood unit concept was evolved with the purpose of providing complete residential areas of around 5,000 people (they range from 4,500 to 6,500) within which the basic needs of the family could be met. It is believed that the provision of basic community facilities, such as schools, clubrooms, neighborhood shopping, etc., will provide a community atmosphere now lacking in our urban developed areas.

To the planner the significance of the neighborhood concept lies in being conducive to unit planning and development. The planner has the opportunity to work with an area that is large enough to permit the integration of residences, community facilities, shopping areas, and recreational spaces. He can thus achieve the maximum in site layout, insuring that each family is in range of necessary facilities, and control of aesthetic values in the spacial arrangement of buildings can be achieved.

Planning on the basis of neighborhoods also achieves economies. By rationally planning the location of residences and services, the amount of streets needed is minimized. The neighborhood also induces better sharing of community facilities, thereby decreasing duplication of services.

In the Proposed Land Use (Plate 1) the neighborhood areas have been delimited. The major feeder roads, for the most part slightly modified existing roads, have been drawn in. Loop roads and cul de sacs (not shown) would serve the houses and apartments direct. It is recommended that steps be taken now to make the minor adjustment of these roads to permit proper neighborhood development in the future.



In conclusion, it is important to remember that final planning should take place on the neighborhood level. With a well-defined plan the construction process can occur in small-development sections or on a broad over-all scale dependent on the initiative and daring of the private developer.

#### Family Size and Composition

Family size and composition condition many decisions to be made in the Study Area. They not only affect the dwelling types to be selected, which in turn affect the density of development, but also affect decisions in regard to schools, playgrounds and other community facilities. Only the dwelling types and neighborhood area requirements will be covered in this report.

#### Family Size

Table 9 compares the percentage distribution of families by size in three widely differing areas. The "East Poplar Area" is blighted and intensely built up in the downtown area of Philadelphia. Norristown on the other hand is a small industrial satellite surrounded for the most part by undeveloped open land. There is a marked tendency of one and two member households to live in the central city. These represent unattached single persons, young and old, newly married couples without children, or old married couples whose children have left home and formed their own households. In contrast to this is Norristown, showing a preponderance of larger households or families with a lot of children. In the future growth of the area as a garden suburb type community, this tendency will persist.

The average family size for Norristown is 4.5 persons per family. This compares to 3.8 for Philadelphia and 3.6 for the United States.\* The family size in the future residential development is expected to follow Norristown. However, with a relief of the present housing shortage, the average family size might drop due to the undoubling of households. Therefore, 4.0 is the assumed family size for calculating the future acreage based on dwelling type for residential development.

Table 9

Sizes of Families Expressed in Percentage

No. of Persons in Household	East Poplar Area**	Philadelphia***	Norristown***
	%	%	%
1	14.9	7.8	6.4
2	38.6	23.4	23.1
3	17.9	22.1	21.3
4	15.7	18.9	17.1
5	5.4	12.3	12.2
6	4.1	7.2	7.6
7	1.5	3.9	5.1
8	.9	2.1	3.3
9	.7	1.1	1.8
10	.2	.6	1.0
11	.1	.6	1.1
	100.0	100.0	100.0

\*\* Philadelphia City Planning Commission, "East Poplar Redevelopment Area Plan," 1948, page 3.

\*\*\* U. S. Bureau of the Census, 16th Census of U. S., 1940, Housing Vol. 2, General Characteristics.

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\* U. S. Bureau of the Census, 16th Census of U. S., 1940, Housing Vol. 2, General Characteristics, Part 4.

### Dwelling Types

The proposed neighborhoods would provide a range of dwelling types designed for a normal cross section of the family sizes discussed under the previous section. This type of neighborhood design should also provide accommodations for families "during the whole cycle of family development, from the phase of child rearing and gradually increasing family size, on to the period when parents whose children have set up their own homes and will normally live by themselves."\*

Table 10 shows the range of dwelling types required for a typical neighborhood of 5,000 persons or 1,250 families based on 4.0 persons per average family. The open undeveloped character of the site and also the many large families lends itself to a high percentage of one-family detached units.

However, almost an equal number of one-family row houses have been included. This large percentage is included to produce housing at as reasonable a cost as possible for workers in industry. The majority will not have sufficient income to pay for one-family detached houses. "Planning the Neighborhood" says: "The row house is economical because grouping reduces street length and saves cost of paving, utilities and land. Yet it gives each family its own home and the opportunity of developing its own plot of land."\*\* The use of the row house will also aid the municipality in reducing street lengths for maintenance, etc., and thereby create a saving for them.

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\* Committee on the Hygiene of Housing, A.P.H.A., "Basic Principles of Healthful Housing," 1939.

\*\* A.P.H.A. Committee on the Hygiene of Housing, "Planning the Neighborhood," 1948, page 26.

Table 10

Dwelling Types by Size of Family in  
Typical Neighborhood of 5,000 Persons (1,250 Families\*)

Number of Persons in Household	Norristown %	Number of Families	Proposed Dwelling Type	Estimated % Distribution					
				1** %	No.	2*** %	No.	3**** %	No.
1	6.4	80	3					100	80
2	23.1	289	2 & 3			40	115	60	174
3	21.3	266	1 & 2 & 3	10	27	80	212	10	27
4	17.1	214	1 & 2	50	107	50	107		
5	12.2	152	1 & 2	70	106	30	46		
6	7.6	95	1	100	95				
7	5.1	64	1	100	64				
8	3.3	41	1	100	41				
9 +	3.9	49	1	100	49				
		1,250			489		480		281

\* Based on average family size of 4.0

\*\* 1-family detached

\*\*\* 1-family row

\*\*\*\* 3-story apartments

Table 11

Land Area and Density for a Typical Neighborhood  
of 5,000 Persons (1,250 families\*)  
in Study Area

Proposed Dwelling Type	Number of Dwelling Units	Required Neighborhood Sq. Ft. per Family**	Land Area Total Acres
1-family detached	489	8,440	95
1-family row	480	3,740	40
3-story apartment	281	2,195	15
	1,250		150 Acres

\* Based on average family size of 4.0

\*\* A.P.H.A. Committee on the Hygiene of Housing, "Planning the Neighborhood," 1948, Table 13, page 65. Note these standards are based on family size of 3.6. For estimating purposes in this study the correction of data to family size of 4.0 was considered unnecessary.

The average complete neighborhood of 5,000 persons, including all neighborhood facilities, such as elementary school, neighborhood shopping center, park and playground, will require 150 acres. In estimating population for larger and smaller neighborhoods, the gross density of 33.2 persons per acre was employed.



## RECREATION

Regional Recreation Requirements

Philadelphia at the present time is a deficit area in regard to outlying park and recreational land for regional needs. The following table, taken from a 1932 study,\* shows these conditions.

Table 12

Acres of Existing Outlying Park per 1000 Persons  
in Whole Region

City	Year Data Obtained	Existing Acres/1000	Proposed Acres/1000
Philadelphia	1931	1.4	10.0
Chicago	1930	7.9	9.4
London	1927	1.5	8.7

The proposed acreage per 1,000 in this table is considerably higher than the standard recommended by the American Public Health Association, which states that "3 to 4 acres of major park area per 1,000 persons is necessary in densely settled communities. Satisfactory parks of this type will usually run from 50 acres upward."\*\*

The recommendations of the Tri-State Report for the immediate Study Area proposed a ribbon or greenbelt 20 miles long be developed in the

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\* Regional Planning Federation of the Philadelphia Tri-State District.

"The Regional Plan of the Philadelphia Tri-State District," 1932, p. 259.

\*\* Committee on the Hygiene of Housing, "Planning the Neighborhood," Public Administration Service, 1948, p. 10.

Chester Valley and that Valley Forge Park, the terminus of the green-belt, be expanded by approximately 20 square miles. This expansion would include the land north and west of King of Prussia. These recommendations have been disregarded.

#### Valley Forge Park Today

Valley Forge Park, site of Washington's immortal encampment, and the commission to run it, were created in 1893 by the Commonwealth of Pennsylvania. The purpose of the commission was stated to preserve the site, to restore it as nearly as possible to its original condition as a military camp, and maintain it forever as a public place or park. This mandate has been literally carried out, even to the extent of building 32 replicas of the soldiers' huts since the last war. They now spot the close-cropped grass of the 2,033 acres (limit of park set at 3,000 acres by legislation).

Attendance records\* show that in 1948 663,000 people came to Valley Forge. The greatest attendance was recorded in the year of Pearl Harbor, 1941, when 792,000 visited the park. The attendance is not an evenly distributed phenomena--peak loads occur in the fall and especially in the spring at dogwood blossom time. It has been estimated that 99% of the visitors come by car and bus, even though the Reading Railroad has two stations--one at General Washington's headquarters, and the other at Port Kennedy. As a result, the roads in Valley Forge are lined with parked cars, and roads are choked with traffic congestion on many busy days.

The park today faces a time as critical as the period in which it was created. The function of the park as originally set forth was

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\* Attendance data furnished by Mr. Phillips, Valley Forge Park Superintendent.

excellent in 1893. Today, by necessity, it must be extended. Two major problems must be faced--one, a design found to recapture the meaning and vitality and purpose that placed Washington here; and, second, the park must, in addition to existing as a national shrine, meet the growing demands for picnic areas, boating, hikes and all other forms of passive and active regional recreation.

#### Growing Demand

The development of the Valley Forge Expressway will put the park a "stone's throw" (25 minutes) from the city center. The park will no longer be an annual pilgrimage, but an area to spend a Sunday or Saturday afternoon, or even an evening picnic in the heat of the summer. The cars that now crowd areas in Fairmont Park will now be crowding Valley Forge.

In addition to the ability to get to Valley Forge in a hurry, the new Schuylkill River Project, a joint reclamation project by the Commonwealth of Pennsylvania and the U. S. Army Engineers, costing 55 million dollars, is under way. Upon the completion of the reclamation of the river, the first to be undertaken by the state, the full recreational potential of the stream should be developed. This will involve swimming, boating, and picnic areas along the shores. None exist at the present time.

#### Recommendations

The principal concept in the plan, Plate 1, is to maintain Valley Forge Park as a national shrine. This large central area would form a core for several smaller areas around it that offered a variety of regional recreation; such as, picnic groves, boating, active sports and games, hiking, golf and all other forms of winter, spring, summer

and fall recreation. The following recommendations carry out this major concept.

(1) Create adequate parking areas in Valley Forge Park proper, designed to be out of the major vistas or properly screened with planting.

(2) Acquisition and elimination of two industries (the Ehret Magnesium Company and the Refractory east of Port Kennedy).

(3) Expansion of area north of Washington's Headquarters and develop the Valley Forge Impounding Basin\* into a play field and the adjoining land into picnic areas. Possible development of a cable ferry at Washington's Headquarters to tie the two areas together.

(4) Expansion of the park east to include the North Abrams Impounding Basin and the area between there and King of Prussia. Both areas could be easily developed for picnicking. The purpose of this acquisition is to protect the principal vistas from the hills of Valley Forge, avoiding development from closing in the park proper. Fortunately the buildings in this general area bring high real estate values because of their historic value, but the trend away from tremendous estates is maturing too quickly to guarantee this protection for long.

(5) Acquisition of the Valley Forge Golf Course by the park as regional recreation facility.

(6) Acquisition of hilly area southwest of park for hikers and picnickers.

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\*The Valley Forge Impounding Basin will be deeded to Valley Forge Park on completion of dredging operations of the Schuylkill River by the Department of Forest and Waters, Commonwealth of Pennsylvania.

(7) Request Pennsylvania Department of Highways to construct a direct access to Route 23, the main feeder road into the park, and a new road into the future playground area at North Abrams Impounding Basin. It is also recommended that the Philadelphia and Western construct a branch trolley line serving the new community, and terminating in the central part of the new proposed park. This line would open the park up to low- and middle-income groups in 69th Street, Philadelphia.

(8) Acquisition of small pie-shaped piece between Valley Forge Expressway and the park.

The total land acquisition program amounts to approximately doubling the present park area.



### CONCLUSION

Today people are fearful of the Valley Forge Expressway, and visualize a 69th Street development at King of Prussia. I believe that one of the major reasons for areas growing "like Topsy" is simply that men and women can't realize the total picture early enough.

One of the important roles of the planner is to visualize and measure these trends. This study has attempted to do this, and translate these growth forces into terms of acreage requirements for various future land uses. These in turn have been fitted to a plan to create a future orderly and sound environment.

The translation of these plans into action and ordinances would be the next step. It would be necessary to create a local planning board, to create a positive zoning ordinance to control growth, not a negative one to maintain the status quo. In addition, subdivision controls and a scheduled public improvement program would follow.

Finally this plan could become action, and action reality.

Appendix "A"

EXISTING INDUSTRIES IN INDUSTRIAL DISTRICTS  
IN STUDY AREA

Source: 1947 Employment - 11th Industrial Directory of the Commonwealth of Pennsylvania  
 1943 Employment - Philadelphia City Planning Commission, "Future Industrial Land Use in Metropolitan Philadelphia," unpublished, with same original source.

1. Swedeland Industrial District

<u>Industries*</u>	<u>Employment</u>	
	<u>1943</u>	<u>1947</u>
Alan Wood Steel Co.		
Large iron and steel plant	1450)	
Blast furnaces (outside Study Area)	238)-1688	1893
(mostly old but substantial structures, with own railroad yard and railroad bridge.)		
Valley Forge Cement Co. with quarry	135	95
Philadelphia Slag Co.	-	25
Warner Lime Co. (quarry and tailing dump)	(?) 40	40
One small plant		11
	<u>1,863</u>	<u>2,064</u>
Total Employment (excluding Alan Wood Steel workers outside of Study Area)	1,625	

\* Not included - Philadelphia Electric gas works that are in process of expansion to receive and distribute natural gas from 10" natural gas line of Transcontinental Gas Pipeline Corp. to be completed by January 1, 1951.

2. Upper Merion Industrial District

<u>Industries</u>	<u>Employment</u>	
	<u>1943</u>	<u>1947</u>
Bethlehem Steel Co. (quarry)	139	139
Welding Engineers, Inc.	518	394
Hutchinson Mfg. Co. (machinery)	77	33
Coopers Creek Chemical Corp. (tar and tar products)		40
Jones Machine Tool Works, Inc.		42
Ellis Concrete Products Co., Inc.		25
Small plants with less than 25 workers	42	54
	<hr/>	<hr/>
	776	727

3. Norristown-Bridgeport Waterfront Industrial District\*

<u>Bridgeport Industries</u>	<u>Employment</u>	
	<u>1943</u>	<u>1947</u>
Summerill Tubing Co. Moved out 1948; plant purchased by Tose (trucking)	1,076	610
James Lees & Sons Co. (woolens)	1,806	1,817
Energetic Worsted Corp. (woolens and worsted yarns)	657	531
Bridgeport Luggage Co. (2-story plant)		65
Continental Diamond Fibre Co. (large 2- and 3-story plant with modern additions)	607	602
Kurtz Bros. Macaroni	348	344
March's Sons, I. F. (boxes, packing crates)		33
Tube Methods, Inc.		35
Carrier Corp. (shapes other than structural)		56
Norris Iron and Wire Works, Inc.		28
Daring Paper Mfg. (paper, cardboard)		33
Bridgeport Pants Co.		65
4 small plants with less than 25 workers		62
	<hr/> 4,494	<hr/> 4,281

\* Not included - New, modern, landscaped Philadelphia Electric Plant on Barbadoes Island between Bridgeport and Norristown.



6. Valley Forge - Abrams Industrial District\*

<u>Industries</u>	<u>Employment</u>	
	<u>1943</u>	<u>1947</u>
Ehret Magnesia Mfg. Co. Medium size plant in Valley Forge Park with inactive quarry. Raw materials shipped in by Reading Railroad.	296	261
Refractory and Insulation Corp.	91	72
Taylor Fibre Co. (plastics manufacture in new one-story plant in Betzwood, north bank of Schuylkill River.	525	540
	912	873

\* Not included is the large classification yard and coal dump of the Reading Railroad at Abrams.

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